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METEOROLOGICAL COMMITTEE

The Committee did not meet

during the

Second World War 1939 - 1945

MINUTES

METEOROLOGICAL COMMITTEE

One Hundred and Sixty-First Meeting, Held in the Air Council Room, Whitehall, at 11 a.m. on 3rd October, 1946.

PRESENT:-

Mr. Geoffrey de Freitas, M.P.,
The Under-Secretary of State for Air. (In the Chair)

Professor S. Chapman (Royal Society)
Dr. G.M.B. Dobson (Royal Society)
Professor Sir D'Arcy Thompson (Royal Society of Edinburgh)
Sir Edward Salisbury (Ministry of Agriculture and Fisheries)
Mr. W.J. Bigg (Colonial Office)
Mr. J.J.W. Handford (Scottish Office)
Captain J.H. Quick (Ministry of Transport)
Mr. W.B. Foden (Air Ministry)
Mr. R.C. Chilver (Air Ministry)
Rear ~~Vice~~-Admiral A.G.N. Wyatt, R.N. (The Hydrographer, Admiralty)
The Director.
Mr. R.J. Williams (Secretary)

Mr. H.M. Garner (Ministry of Supply) representing Sir Ben Lockspeiser; Wing Commander E.M. Macintosh (Ministry of Civil Aviation) representing Mr. W.E.B. Griffiths, and Captain L.G. Garbett (Director of Naval Meteorological Service) also attended.

An apology for absence was received from Brigadier F.S. Siggins representing the Director of Artillery, War Office.

1383 Changes in Membership

The Chairman stated that owing to the war the Committee had not met for seven years, and only four members of the previous Committee (Professor Chapman, Sir D'Arcy Thompson, Mr. W.J. Bigg and the Director) were now serving on the Committee. The Chairman extended a warm welcome to the new members.

1384 Election of Vice-Chairman

The Chairman referred to the rule that the Vice- Chairman shall be selected from among representatives of the Royal Society and the Royal Society of Edinburgh, and invited nominations for this office.

It was proposed by D.M.O. and seconded by Sir Edward Salisbury, that Professor S. Chapman should be Vice-Chairman. This was agreed to by the Committee.

1385 Reorganisation of the Meteorological Office and Proposal to form a Department of Meteorology.

The Chairman suggested that the Director's Memorandum on the Reorganisation of the Meteorological Office (M.C.-1) and the Memorandum by the Institution of Professional Civil Servants (M.C.-2) should be considered together. He stated that the reorganisation of the Meteorological Office was based on the Government's proposals for improved conditions in the scientific branches of the Departments contained in the Barlow Report on the Scientific Civil Service (Cmd. 6679).

The Director summarised his memorandum (M.C.-1) and stated that the Barlow Report proposed the formation of a small but select class of scientific officers to whom would be assigned only work demanding the highest scientific qualifications and ability. All other work of a routine scientific and technical character would be performed by a class of Experimental Officers who did not require such high qualifications as the scientific officers. There would also be a third category of assistants who would perform simple technical duties such as the drawing of synoptic charts and making meteorological observations. By limiting the numbers in the scientific officer class, the prospects of promotion could be much improved, and it was hoped to attract into the Meteorological Office men of the highest calibre. The salary scales of experimental officer and the assistant classes were such as to provide satisfactory career prospects in both of these classes. The transformation from the two classes under the present Carpenter Scheme to the Barlow classes involved a complete re-casting of the establishment of the Meteorological Office. In 1939 the staff of the Office numbered about 800, of which approximately one third were scientific officers and the remainder assistants. During the war the numbers increased to about 6,700, of which over 2,000 were of the officer class. It is proposed that the post-war strength of the Meteorological Office would be about two and a half times the strength before the war. Proposals had been drawn up for the re-organisation of the Office to conform to the Barlow Scheme. The proposals provided for the following numbers in each of the three classes of staff:-

Scientific Officer Class	193
Experimental Officer Class	635
Assistant Class	1,291

The proposed scheme had been sent to the Treasury for approval. Steps had been taken to assimilate the existing staff into the new grades up to the rank of Principal Scientific Officer according to the numbers provisionally approved by the Treasury. When formal Treasury approval of the complete scheme had been obtained, it would be necessary to select members of the Meteorological Office staff to fill the higher appointments in the new organisation. For this purpose it would be necessary for the Committee to appoint a small sub-Committee to make recommendations, and this aspect of the matter would be dealt with later in the Agenda (See Min. 1388).

Professor Chapman commented on the top structure of the Office, and noted with satisfaction that provision had been made for research work.

The Chairman stated that special emphasis had been given to research in the new scheme, and that the division of the work of the Office would provide interested users with the necessary contacts in the appropriate Assistant Directorate.

The Director mentioned that under the new scheme, provision was specifically made for agricultural meteorology in the organisation of the Office for the first time.

Sir Edward Salisbury expressed his gratification at this innovation.

Mr. Garner remarked that scientific officers with suitable qualifications and aptitude should be available for transfer to other Departments.

Dr. Dobson commented upon the proposed post of Assistant Director for instrument development, and considered that it was important that contact should be maintained with development work outside the Meteorological Office.
Sir D'Arcy Thompson asked for more information upon the functions of the Deputy Director (Research).

In reply, the Director explained that certain aspects of this research work could not conveniently be divorced from the work of the Branches, and provision was therefore made in the scheme for such Branches to conduct their own research. The Deputy Director (Research) would be responsible for investigations which are not assigned to Branches in this way, for the co-ordination of all research work done in the Office, and for all work in connection with the Meteorological Research Committee. (See Min.1387).

Sir Edward Salisbury commented on the scope of work under the Deputy Director (Research) and added that he considered that it should not conflict with the work done at the Universities.

The Chairman stated that this aspect would be considered by the Committee at a later stage (See Min.1387).

After some further discussion, the Committee endorsed the proposed scheme for the reorganisation of the Meteorological Office, and expressed the hope that Treasury approval of it would not be long delayed.

The Chairman referred to the memorandum by the Institution of Professional Civil Servants on a proposal to form a Department of Meteorology, and stated that no complaints had been received from the interested Departments, about the services provided by the Meteorological Office whilst attached to the Air Ministry. In these circumstances there did not appear to be strong grounds for re-opening the decision taken by the Government in 1919 that the Meteorological Office should form part of the Air Ministry.

1386 Provision of Meteorological Services in the Colonies.

The Director referred to the memorandum (M.C.-3) and stated that prior to the war the meteorological services of the Colonies were for the most part small organisations, and during the war were brought under Air Ministry control. Recent developments in the technique of meteorology and the demand for increased meteorological facilities for aviation and other purposes have given rise to a number of problems relating to the future organisation of meteorological services in the Colonies. The limited scope of promotion in the small Colonial meteorological services has in the past made it difficult to attract good men, and the lack of contact with research and development in the outside world has also made good men hesitate to join the meteorological services in the Colonies. The Director considered that these disabilities would be overcome if Colonial meteorological services were brought within the framework of the Meteorological Office. A scheme has been formulated for bringing the various Colonial meteorological services under the control of the Meteorological Office. The scheme visualises a series of regions, each under a regional director possessing a large measure of autonomous power. Members of the scientific staff would be interchangeable with the staff of the Meteorological Office, both in the United Kingdom and in other parts of the Colonial Empire. The scheme has been approved by the Air Council, and is now with the Colonial Office.

Mr. Bigg commented upon the proposed scheme, and stated that it was supported by the Colonial Office. It would, however, be necessary to consult the Colonial Governments concerned.

Professor Sir D'Arcy Thompson asked if Ceylon was included in the scheme. Mr. Bigg replied in the affirmitive, but added that it was not yet known whether that Colony would agree to participate in the scheme.

Sir D'Arcy Thompson went on to say that he had received information from Colombo University that the meteorological records made at the R.A.F. Stations in Ceylon during the war had been destroyed. The Director of the Meteorological Office considered this extremely unlikely, as it would be contrary to instructions which had been issued on the subject. He undertook to look into the matter.

The Committee agreed in principle to the proposed scheme for meteorological services in the Colonies.

1387 Meteorological Research Committee.

The Chairman drew the attention of the Committee to the memorandum by the Director (M.C.-4)

The Director stated that the purpose of the memorandum was to bring the existence of the Meteorological Research Committee to the knowledge of the Committee.

Professor Chapman remarked that the formation of the Meteorological Research Committee was suggested by the Meteorological Committee at a meeting of the latter body shortly before the outbreak of war. He added that the Meteorological Research Committee could already claim to have done important and useful work.

Professor Sir D'Arcy Thompson commented on the memorandum, and stressed the importance of study and research in the normal work of the Office.

The Chairman confirmed that more emphasis would be given to research in the work of the Meteorological Office in future (Cf. Min.1385).

The Committee noted the Director's memorandum on meteorological research.

1388 Election of Sub-Committee to Recommend Senior Appointments in the Barlow Reorganisation of the Meteorological Office.

The Chairman asked for nominations for four members of the Committee to serve on a sub-Committee to advise the Secretary of State upon the senior appointments provided in the Barlow reorganisation of the Meteorological Office (See Min.1385). The Chairman considered that the sub-Committee should consist of two scientists, the Principal Establishment Officer and the Director.

Professor Chapman and Dr. Dobson were proposed and seconded as scientist members of the sub-Committee.

The Committee approved the formation of the sub-Committee composed as follows;-

Professor S. Chapman
Dr. G.M.B. Dobson
The Principal Establishment Officer, Air Ministry.
The Director.

1389 Annual Report of the Director.

The Director reminded the Committee that it was one of the functions of the Committee to approve the Annual Report of the Director. This practice was necessarily in abeyance during the war. A detailed account of the work of the Meteorological Office during the war was in the course of preparation, and this would be included in the "Official History of the War". This document would be available to the Committee. The Director proposed that his next Report should cover the period from the cessation of hostilities until 31st March, 1947. Subsequently, Annual Reports would be submitted as before the war.

The Hydrographer stated that it had been decided that the Director of the Meteorological Office should prepare the account of the wartime work of both meteorological services for inclusion in the "Official History". He suggested that it might therefore be desirable for the Director of the Naval Meteorological Service to collaborate with the Director of the Meteorological Office for this purpose.

The Chairman agreed that it was important that the reports on meteorology during the war should be co-ordinated. He suggested that the report by the Director of the Naval Meteorological Service should be included as an appendix to the Report of the Director. He agreed, however, that the details should be left to be decided between the Director of the Meteorological Office and the Director of the Naval Meteorological Service.

In connection with future annual reports, Professor Chapman suggested that consideration should be given to making the reports more comprehensive by including an account of the work of the Naval Meteorological Service as well as the Meteorological Office. It was agreed that the practicability of doing this should be examined by the Directors of the two Services jointly.

The Committee approved the Director's proposals for the resumption of Annual Reports, subject to the examination of Professor Chapman's suggestion.

1390 International Meetings, December 1944, to September, 1946.

The Director stated that during the war international co-operation in meteorology gave place to inter-allied co-operation. After the cessation of hostilities it became necessary to re-establish the work of the International Meteorological Organisation, and during the past six months several meetings of the International Meteorological Committee and its Commissions had been held. A Conference of Directors of Meteorological Services had been held in London in February, 1946, to get the machinery working again. Meetings had been held in Paris during June and July to arrange the introduction of new technical procedures.

The Director also referred to the work of the Provisional International Civil Aviation Organisation which was mainly concerned with the standardisation of procedures and practices for civil aviation. The Meteorological Office partidipated fully in the work of this Organisation.

Professor Sir D'Arcy Thompson enquired if the Provisional International Civil Aviation Organisation was interested in meteorology only from the civil aviation aspect. The Chairman confirmed this, and stated that with the growth of civil aviation, public interest in meteorology had become much wider. In consequence, more criticism of meteorological services is to be expected in the future than has been the case in the past.

Professor Chapman remarked that meteorology was to be complimented upon the large measure of international co-operation that had been developed.

The Director referred to the North Atlantic Meteorological Ships Conference which had recently been held in London at the instigation of the Provisional International Civil Aviation Organisation. A scheme had been worked out and an International Agreement signed for establishing meteorological ships at thirteen stations in the North Atlantic.

The Chairman remarked that the Ships Conference had showed the value of international co-operation.

The Committee noted the international activities of the Office.

1391 Date of Next Meeting.

The Chairman suggested that the date for the next meeting of the Committee should be left open until it was possible to ascertain the outcome of the proposed scheme for the reorganisation of the Meteorological Office.

The Committee concurred.

1392 The Committee rose at 12.10 p.m.

Meteorological Office,
Air Ministry,
London, W.C.2.

G.137210.

METEOROLOGICAL COMMITTEE.

AIR MINISTRY.

Reorganisation of the Meteorological Office.

1. Introduction.

The Government has decided to improve the conditions of service in the scientific branches of Departments in a way which, they hope, will attract into the Civil Service scientifically qualified men and women of the highest calibre.

The method recommended by the Barlow Committee for securing this result consists in the formation of a small but select class of Scientific Officers, to whom would be assigned only work demanding the highest scientific qualifications and ability. All other work of a scientific and technical character would be performed by a class of Experimental Officers, whilst routine and simple technical duties would fall to yet a third class of Assistants.

By limiting the numbers in the Scientific Officer class, the prospects of promotion to the higher grades can be much improved, and a range of salary rates has been approved which represents a material advance on those at present in force. At the same time, the salary scales for the Experimental and Assistant classes are to be such as to provide satisfactory career prospects in each of these classes.

The Barlow Report and a statement of the Government's plans for implementing its recommendations are contained in H.M. Stationery Office publication Cmd.6679. (Appendix I to this memorandum).

2. Present Organisation of the Meteorological Office.

At the present time the Meteorological Office, in common with other Government technical departments, is composed of staff graded in accordance with the recommendations of the Carpenter Committee Report of 1930. In this organisation there are only two classes - the Scientific (or Technical) Officer class and the Technical Assistant class. The transformation from the two Carpenter classes into the three Barlow classes therefore involves a complete re-casting of the entire establishment. In addition, it necessitates a modification of the organisation to allow for the new distribution of duties among the different grades.

The present functions and organisation of the Meteorological Office are given in Appendix II to this paper. The diagram at the end of the Appendix shows the present top-structure.

3. Proposed Reorganisation of the Meteorological Office.

Proposals have been drawn up for reorganising the Meteorological Office to conform to the Barlow scheme. The proposals provide for the following numbers in each of the three classes of staff :-

Scientific Class	193
Experimental Class	635
Assistant Class	1,291

The new organisation has been planned to make full use of the numerous developments which occurred during the war, and it also visualises an increased demand for meteorology, notably in the fields of civil aviation and agriculture. The top structure proposed for the reorganised Meteorological Office is shown in Appendix III.

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The existing staff are being assimilated or re-appointed into the new grades up to the rank of Principal Scientific Officer (£800 to £1,100 per annum.).

When formal Treasury approval of the complete scheme has been obtained, it will be necessary to select members of the Meteorological Office staff to fill the higher appointments in the new organisation. For this purpose, it is considered that a small Selection Board should be set up by the Meteorological Committee to make recommendations. This aspect of the matter is dealt with under another item of the Agenda (Item 7).

In the meantime, the comments of the Meteorological Committee are invited upon the proposed reorganisation of the Meteorological Office as set out in Appendix III.

N.K. JOHNSON.

D.M.O.

Meteorological Office,
Air Ministry, Kingsway, W.C.2.
September, 1946.

THE
SCIENTIFIC CIVIL SERVICE

Reorganisation and Recruitment during the Reconstruction Period

Presented by the Chancellor of the Exchequer to Parliament
by Command of His Majesty
September 1945

LONDON
HIS MAJESTY'S STATIONERY OFFICE
THREEPENCE NET

Cmd. 6679

THE SCIENTIFIC CIVIL SERVICE

PART I. PROPOSED REORGANISATION

1. The Government have decided that the Scientific Civil Service is to be reorganised. They are deeply conscious of the contribution made by science towards the winning of the war, a contribution which may have altered the whole course of the war and has certainly shortened its duration. They are equally conscious of the contribution which science can make during peace to the efficiency of production, to higher standards of living, to improved health, and to the means of defence. They are resolved that the conditions of service for scientists working for the Government shall be such as to attract into the Civil Service scientifically qualified men and women of high calibre, and to enable them after entry to make the best use of their abilities, in order that scientists in the Government Service may play their full part in the development of the nation's resources and the promotion of the nation's wellbeing.

2. Investigation into the conditions of service, pay and career of scientists in the Civil Service was begun under the Coalition Government. They also were resolved on reorganisation of the Scientific Civil Service, and the scheme set out in this Paper has been under discussion between the Departments principally concerned for some months. The present Government have decided that it should be promulgated at once, and Departments are being instructed to reorganise their scientific establishments and to plan their recruitment of scientific staff on the lines set out in this Paper.

Barlow Committee.

3. As a preliminary to the consideration given by the Coalition Government to the reorganisation of the Scientific Civil Service, the Treasury set up a small Committee to undertake, without any formal or public enquiry, a survey of the remuneration and conditions of service of scientists in Government Departments. The Chairman of the Committee was Sir Alan Barlow, Second Secretary to the Treasury, and the other members were Sir Edward Appleton, Secretary of the Department of Scientific and Industrial Research, Mr. W. F. Lutyens, of Imperial Chemical Industries, Ltd., and Professor E. K. Rideal, of the Department of Colloid Science, Cambridge University. The report of the Committee is published as an Annex to this Paper. Most of its recommendations are accepted and are incorporated in the Government's proposals as set out in this Paper; but the Government have thought it necessary to carry their proposals for the reorganisation of the Scientific Service a good deal farther than the Committee were able to do.

4. It is convenient to divide the Government's proposals under three main heads which, in their opinion, form the essential conditions of a strong and healthy Scientific Service. These are better conditions of service for scientists, and in particular conditions under which their own experimental research will be both facilitated and stimulated; improvement of their status and remuneration; and centralised recruitment. The Government's proposals are therefore set out under these three heads.

Conditions of Service.

Establishment of Interdepartmental Scientific Panel.

5. The Committee recommended that a Panel should be set up to maintain a uniform standard for promotions and special advancements in the Scientific Service and to improve administrative liaison between Departments. The Government welcome the proposal generally (though the arrangements for advancing staff will be somewhat different from those proposed by the Committee—see paragraph 8); and a Panel will be set up very shortly. The Secretary of the Department of Scientific and Industrial Research has agreed to act as Chairman of the Panel and representatives of the main scientific

organisations in other Departments will be invited to become members. In addition Departments will be asked to nominate representatives of their administrative staffs to be members of the Panel, and an officer of the Treasury will act as secretary. The Government propose that the functions of the Panel should be rather wider than those suggested by the Committee. They will include responsibility for keeping under review the well-being and efficiency of the Government Scientific Service and for making proposals for any changes in the organisation or conditions of service which would promote the well-being or increase the efficiency of the Service.

Contacts with Scientific Research and Development outside the Government Service.

6. The Committee made a number of recommendations (paragraph 15 of their Report) designed to eliminate the "isolationist" tendency to which scientific work in Government Departments is apt to be a victim. The Government particularly approve these recommendations, and they propose that the new Interdepartmental Scientific Panel should be asked as one of its first tasks to consider how they can be implemented. In particular the Government view sympathetically the recommendation that secrecy restrictions should be as much as possible relaxed, and scientific workers in Government Service encouraged both to publish work of their own and to discuss their work with persons outside the Service engaged on similar problems.

Superannuation.

7. In order that pension arrangements may not constitute a barrier to interchange of staff with the Universities, almost all Scientific Officers in the permanent service of the Government will be brought under the Federated Superannuation Scheme for Universities. The only exception will be Scientific Officers in the Meteorological Office, for whom pension under the Superannuation Acts will be preferable in view of the lack of opportunity for interchange of employment in their special field. As regards the superannuation arrangements for Experimental Officers, see paragraph 17 below.

Status and Remuneration.

Scientific Officers.

8. The salaries of the most highly qualified members of the Scientific Service are to be brought into relationship with those of the Administrative Class; at the recruitment stage they are to be aligned to them. Details of the new scales are set out in the appendix. A scale structure identical with that of the Administrative Class would not meet the requirements of the scientific organisations; but highly qualified scientific graduates will be recruited, as Scientific Officers, to the same salary scale as Assistant Principals (subject to a lower maximum to allow for an additional grade); and Principal Scientific Officers will receive the same salary as Principals. The Committee recommended that the outstanding scientist should have a reasonable expectation of reaching the Principal Scientific Officer grade in the early thirties, and the Government agree that staff complements should be so arranged as to ensure this. Every Scientific Officer of proved ability should reach this grade in a reasonable period. The scales now proposed, combined with improved complementing, will, in the opinion of the Government, provide for the rapid advancement in early years which the Committee recommended (paragraph 9) more satisfactorily than extension of the system of special jumps within the scale.

9. Special provision will be made for recruiting above the normal minimum salary University graduates with research qualifications. In exceptional cases, scientists will be recruited direct to grades above the basic, where they possess special qualifications or experience which a Department requires.

10. The Committee also recommended that ultimate prospects should be improved and this recommendation also the Government accept. Improvements will be made in the scales or rates attaching to existing higher scientific posts (see appendix); and in addition, as recommended by the Committee, the number of posts above the Principal Scientific Officer level will be increased in order to provide for the promotion of individual research scientists of exceptional quality without necessarily expecting them, as was usual before the war, to carry administrative responsibilities. As it is not practicable to provide for all the individual research scientists of exceptional quality who may emerge, within a system of fixed complements of higher posts, Departments will be asked to make proposals for the creation of such posts *ad hoc*; and these will be considered first by the Scientific Panel, recommendations being made by the Panel to the Treasury. The salary to be attached to these posts will be that shown in the appendix as applicable to Senior Principal Scientific Officers (£1,200 to £1,400) or in the case of a scientist of quite exceptional quality that shown as applicable to Deputy Chief Scientific Officers (£1,600 to £1,800).

11. At the present time the highest scientific posts in the Civil Service, excepting the post of Secretary to the Department of Scientific and Industrial Research, carry a salary of £2,000 per annum. This was agreed during the war for the Heads of some of the Research Institutions. In future there will be at the highest levels salaries of £2,250 and £2,500, and in the whole Civil Service two or three posts will be graded at £3,000. The grading of the highest posts has still to be worked out in detail between the Treasury and Departments.

12. It must be emphasized that these scales represent a new structure. The existing scales are also shown in the appendix. Although in some cases titles identical with existing titles are used, the new grade does not represent the old. Thus at present "Scientific Officers" have a scale of £400—£680, and "Senior Scientific Officers" have a scale of £680—£800. Under the new proposals the scales attaching to these titles are respectively £275—£500, and £550—£750. "Scientific Officer" however will in future be the basic grade, absorbing the old Junior Scientific Officer grade (£275—£347) as well as Scientific Officers of a few years service; whilst the new Senior Scientific Officer grade will embrace mainly the equivalent of senior members of the present Scientific Officer grade. The Principal Scientific Officer grade remains broadly as at present, but the number of Principal Scientific Officers in relation to the whole Scientific Officer class must be substantially increased in order to allow the career envisaged.

Experimental Officers.

13. The arrangements proposed for Scientific Officers will be capable of fulfilment only if the present Assistant Class is strengthened and more fully used, much of the work at present done by Scientific Officers being devolved on Scientific Assistants. Unless this is done the reorganisation of the Scientific Service will be stultified. A good deal of the work now carried by Scientific Officers does not require the highest academic qualifications, and unless this is devolved, it will be impracticable to arrange complements in such a way that the Principal Scientific Officer grade will bear that proportion to the Scientific Officer Class which is intended. Moreover the present Assistant Class does not provide in itself a satisfactory career, nor one related to the qualifications of many of its existing members, and for its own sake as well as for the support which it can and should give to the whole Scientific Service, it is to be wholly reorganised.

14. The Class will be re-named the Experimental Officer Class. New salary scales will be introduced as set out in the appendix. Existing scales are also

[illegible] The new basic scale for Assistant Experimental Officers is aligned to the scale applicable to Junior Executive Officers (though again shortened, as in the case of Scientific Officers, in order to allow for an intervening grade not present in the Executive Class) and it is intended that the Class shall be partly recruited from boys and girls aged 18 to 19, of the same type as come into the Executive Class, but specialising in scientific subjects. Experimental Officers will also be recruited from University graduates and from persons with experience in industry and engineering, since Departments need a variety of types. For these older recruits higher starting salaries will be provided.

15. There is no direct comparison between the new Experimental Officer grades and the existing Assistant grades, except at the basic level. Departments will first arrange their complements (providing, as explained above, for devolution of work from Scientific Officers to Experimental Officers) and then select those members of their staff best fitted to fill the new grades of Experimental Officer and Senior Experimental Officer. It will be necessary that some existing Scientific Officers and Senior Scientific Officers should be re-graded Experimental Officer and/or Senior Experimental Officer, accompanying the re-grading of the work.

16. There will be provision for promotion from the Experimental Officer Class to the Scientific Officer Class, but the precise conditions under which promotions will take place require further consideration, and this question will be remitted at an early date to the Scientific Panel for advice.

17. As regards the superannuation of Experimental Officers, they will normally be brought under the Superannuation Acts, but consideration is being given to the possibility of continuing the present exceptional provision for the application of the Federated Superannuation Scheme for Universities to such staff in the Department of Scientific and Industrial Research.

Provincial differentiation.

18. As explained the salary scales of the new Scientific Service have been deliberately brought into relationship with those of the Administrative and Executive Classes, and at certain points they are identical. It is a feature of the pay arrangements for these Classes that scales are subject to some reduction outside London. The Government have thought it necessary, as part of the reorganisation, to apply the same arrangements to the Scientific Service, although previously the scales of Scientific Officers and Scientific Assistants have not been differentiated, and notwithstanding that a large proportion of the Scientific Service is located outside London. It does not seem possible to justify a distinction in this respect between the different Classes.

19. Generally speaking, non-differentiation of salary scales between London and the Provinces is found in the Civil Service where the members of the class or grade are subject to a particular liability to move from place to place, and it has been argued on occasion that this is the justification for non-differentiation. Many Scientific Officers and some Experimental Officers will be required to move during their service (all will be liable both to transference in this country and to service overseas); and it might, therefore, be thought that this was an argument for retaining non-differentiation, in spite of the alterations of the salary scales and the linking with general Service scales. The whole question has, however, been under consideration in the Treasury, in view particularly of the likelihood that civil servants generally may be expected to be more mobile in the future than in the past, and the conclusion has been reached that to allow undifferentiated salary scales to all members of a grade or class, whether in practice they move frequently, seldom or not at all, is not an appropriate way of compensating for the disturbance caused by moves; and that it would be better to compensate by a lump sum payment made at the time of a move. It is proposed to apply

this system in the future to members of the general Service classes who are on differentiated scales of pay, and it seems the more appropriate way of dealing with the members of the Scientific Service on reorganisation.

Discussion with staff representatives.

20. The above proposals have been discussed between the Treasury and the Institution of Professional Civil Servants, but the Institution have not felt able to agree to them, particularly in the absence of information about future complements, which have still to be worked out. The Institution have especially objected to the application of provincial differentiation.

Centralised Recruitment.

21. In order to ensure the maintenance of high standards throughout the Service, and for the benefit of candidates who wish to know what careers are open to them, it is desirable that central recruitment should be introduced. It is therefore proposed that in future the whole of the Scientific Service shall be recruited centrally through the Civil Service Commission. With this in mind, the Commissioners have invited Dr. C. P. Snow, C.B.E., Fellow of Christ's College, Cambridge, and until recently Technical Director for allocation of scientific personnel in the Ministry of Labour and National Service, to join them on a part-time basis, and his name will in due course be submitted to His Majesty for appointment as an additional Commissioner, with special responsibility during the reconstruction period for the recruitment of Scientific and Experimental Officers.

Research Institutions not forming part of the Government Scientific Service.

22. The scheme of reorganisation here outlined applies to staff employed directly by Government Departments. The adaptation of these arrangements to suit the needs of staff employed by other Institutions which conduct scientific research, e.g. those Institutions which work under the aegis of the Medical Research Council, the Agricultural and Fishery Departments and the Development Commission is now under consideration. The staff of the Geological Survey and Museum (Department of Scientific and Industrial Research) whose conditions of work and service differ in some respects from those of other scientific staffs in that Department and in other Departments, will also receive separate consideration in the light of their special conditions and the general principles embodied above.

PART II. RECRUITMENT TO THE SCIENTIFIC SERVICE DURING THE RECONSTRUCTION PERIOD

23. The general principles which are to apply to post-war recruitment to the Civil Service have already been indicated in the statement of Government policy accepting the Report of the Civil Service National Whitley Council on Recruitment to Established Posts in the Civil Service during the Reconstruction Period (Cmd. 6567). These general principles were formulated in relation to the Administrative, Executive and Clerical Classes. The special problems of the Scientific Classes have now been discussed with the National Staff Side. In the result certain adjustments of detail are proposed, but the broad pattern remains unaffected.

24. The general principles set out in Cmd. 6567 may conveniently be summarised as follows:—

(i) Normal recruitment by open competition of appropriately qualified persons should be resumed at the earliest possible date.

(ii) Special reconstruction competitions should be held over a period, and should be designed to restore the opportunity of competing to those who have lost it in consequence of the war.

(iii) Reconstruction competitions should be held under conditions which give those who have served in the Forces full opportunity to compete, and guarantee to them a generous proportion of the vacancies.

(iv) Arrangements should be made for permanent retention of exceptionally well qualified temporary staff who are over the age limit for reconstruction competitions.

25. It has been agreed with the National Staff Side that these general principles can best be applied in the scientific field on the following lines, and recruitment will be carried out accordingly.

(i) Open competitions for entry to the Scientific Civil Service should begin to operate as soon as possible. These competitions will, as previously stated, be held centrally under the auspices of the Civil Service Commission, which will in due course publish regulations giving full particulars of the conditions governing them, and will invite applications.

(ii) As in the case of the other general Classes, special reconstruction competitions will extend over a period. These also will take place under the auspices of the Civil Service Commission, and regulations governing entry will shortly be published.

In the case of the Administrative and Executive Classes, the upper age limit for the reconstruction competitions will be 30 (or, more precisely, born on or after the 2nd August, 1915) in order to give an opportunity to all those who might normally have competed at an earlier age but for the war, plus some opportunity to rather older persons who may have been unsettled by the war and are still young enough to embark on a new life career. This arrangement appears also to be appropriate in the case of scientific staff, and it is proposed to apply it without alteration.

The competitions will take place on the basis of educational record and experience, together with interview, and such tests of fitness, in the case of Experimental Officers, as the Commissioners may prescribe. Candidates will, however, be required to have certain minimum educational or technical qualifications which will be specified by the Commission in the regulations.

(iii) In order that scientists serving in the Forces may be assured of an opportunity of entering the Scientific Civil Service, if appropriately qualified, full particulars will be published throughout the Forces, and arrangements will be made to ensure that vacancies are kept open until any possible candidates who are still serving in Europe or the Far East have had an opportunity of being considered.

(iv) It is proposed to make provision for retention in a permanent capacity of specially selected senior temporary Officers who were born before August 2nd, 1915, that is those who are above the maximum age allowed in the open reconstruction competitions, and who possess exceptional ability, or experience of particular work. Officers may be retained as Senior Scientific Officers, Principal Scientific Officers, or in higher grades of the Scientific Officer Class; or in the Experimental Officer Class as Senior Experimental Officer or possibly as Experimental Officer. Temporary members of the staff recommended for permanent retention will be nominated by their Departments and subsequently interviewed by the Civil Service Commission.

In addition provision will be made, as has been done in the Executive Class, for the retention in the basic grade of Assistant Experimental Officer of a proportion of the best of the temporary Officers, over the age of thirty, at present serving in the existing basic grades of Assistant II and Assistant III, who have at least two years' service (including any intervening period of service with the Forces) to their credit.

APPENDIX

Salary Scales

All salaries up to £1,500 are subject at present (September, 1945) to the war bonus addition of £60 for men of 21 and over. Except where otherwise shown this bonus, if still in general operation, will apply to the new scales.

The scales shown are those for men. In accordance with normal Civil Service practice, scales for women are somewhat lower.

The existing grades include, in addition to those named, Technical Officer and Chemist grades on similar rates of pay. In future these grades will be merged in the new grades shown below, and will not be continued.

Present Scales

Scientific Officers (*men*)	
Junior Scientific Officer	£275–£347 (× £18)
Scientific Officer	£400–£680 (£400 × £18–£454 × £25–£680: bar at £580).
Senior Scientific Officer	£680–£800 (× £25)
Principal Scientific Officer ...	£850–£1,050 (× £30)
Superintendent	£1,050–£1,250 (× £30)
Various grades carrying salaries up to	£1,650
Various posts at	£1,900 and £2,000

New Scales

Scientific Officers (*men*)	*London*	*Provincial*[*]
Scientific Officer (two to four years, probationary).	[1]£275–£500 (× £25–£400 on confirmation of appointment).	£255–£470 (× £25–£370 on confirmation of appointment).
Senior Scientific Officer ...	£550–£750 (× £25)	£520–£710 (× £25)
Principal Scientific Officer	£800–£1,100 (× £30)	£750–£1,020 (× £30)
Senior Principal Scientific Officer[2]	£1,200–£1,400 (× £50)	£1,100–£1,300 (× £50)
Deputy Chief Scientific Officer[2]	£1,600–£1,800 (× £50)	£1,500[3]–£1,700 (× £50)
Chief Scientific Officer[2] ...	£2,000	£1,900
Various posts at	£2,250 and £2,500 ...	£2,150 and £2,400
Two or three posts	£3,000	

[1] Higher starting points for graduates with post-graduate experience in research.

[2] These titles do not correspond with any in use at present, and may not ultimately be thought appropriate. The posts to which these scales will apply have a wide variety of names, Superintendent, Chief Superintendent, Assistant Director, Director and many others. The nomenclature should be simplified and as far as possible made common throughout the Scientific Service.

[3] Inclusive of bonus.

Assistants (*men*)	
Grade III	£130–£310 (× £12)
Grade II	£315–£385 (× £12)
Grade I	£400–£515 (× £18) (exceptionally to £580)

Experimental Officers (*men*)	*London*	*Provincial*[*]
Assistant Experimental Officer	£150–£350 (× £15–£195 × £18–£350)	£140–£320 (× £15–£185 × £18 – £320)
Experimental Officer ...	£400–£550 (× £18)	£370–£520 (× £18)
Senior Experimental Officer	£600–£800 (× £25)	£570–£750 (× £25)

[*] In certain large centres of population the scales of salary are intermediate between the London and Provincial rates.

ANNEX.

REPORT OF THE BARLOW COMMITTEE ON SCIENTIFIC STAFF

Members:—

Sir **Alan Barlow**, K.C.B., K.B.E., Treasury (*Chairman*).

Sir **Edward Appleton**, K.C.B., F.R.S., Department of Scientific and Industrial Research.

W. F. **Lutyens**, Esq., Imperial Chemical Industries, Ltd.

Prof. E. K. **Rideal**, M.B.E., F.R.S., Department of Colloid Science, Cambridge University.

E. A. **Shillito**, Esq., Treasury (*Secretary*).

1. We were asked to undertake, without any formal or public enquiry, a survey of the remuneration and conditions of service of scientists in Government Departments with a view to making recommendations, which might form a basis for action as soon as circumstances permit action to be taken. We were asked to consider in particular three points:—

(*a*) the comparison between the initial salaries of administrative entrants and scientific entrants;

(*b*) the question whether the existing conditions of service for scientists provide adequate prospects for the average entrant;

(*c*) the question whether sufficient facilities exist for free interchange of scientific personnel, and in particular research scientists, between the Government service on the one hand and the universities, industry and outside bodies in general on the other.

2. We understand that any large-scale revision of the pay and conditions of service of Government servants cannot be contemplated during the war, and that in considering the position of scientists account would obviously also have to be taken of the position of other specialist classes. We have set out in this Report what we consider to be the essential principles which should be followed in order to secure a higher standard of recruitment into, and so raise the general level of, the Scientific Establishments of the Government Service. As any such revision would involve discussions of a full and formal nature regarding details with all interested parties in the light of prevailing conditions, we have not attempted to make detailed recommendations. Nevertheless, we regard it as essential that our recommendations should be implemented at the earliest possible opportunity, and wherever it may be appropriate without waiting for a fuller post-war enquiry. We have confined our enquiries in the main to the Defence Departments and the Department of Scientific and Industrial Research, the majority of whose scientific staff are physicists and chemists. We have not regarded the engineering or medical services as coming within our scope.

3. We have had the benefit of discussions with representatives of the Admiralty, the Ministry of Aircraft Production, the Department of Scientific and Industrial Research, the Ministry of Supply, the Colonial Office and the Ministry of Agriculture. We have also seen Lord Cherwell, then Personal Assistant to the Prime Minister, and Professors T. R. Merton and I. M. Heilbron, Scientific Advisers to the Minister of Production. We have heard the views of the former Secretary of the Cambridge Appointments Board and have received memoranda from the Vice-Chancellor of St. Andrew's University and the Principal of the Manchester School of Technology. We have consulted Professor P. M. S. Blackett, Professor Sir W. L. Bragg and Professor A. V. Hill, M.P. Information about the terms of employment offered by Imperial Chemical Industries, Ltd., has been furnished to us, and we have had a discussion with Dr. A. P. M. Fleming of Metropolitan Vickers, Ltd. The Institution of Professional Civil Servants have submitted a memorandum regarding their views.

4. The present terms of service of scientific staff derive from the recommendations of a Committee which reported in 1930 under the Chairmanship of Professor H. C. H. Carpenter (later Sir Harold Carpenter). The Royal Commission on the Civil Service (1929-1931) endorsed those recommendations. They were not brought fully into operation until 1936. The principle common grades are as follows:—

	£		£		£
Junior Scientific Officers	275	×	18	—	347
Scientific Officers	400	×	18	—	454
		×	25	—	680
Senior Scientific Officers	680	×	25	—	800
Principal Scientific Officers	850	×	30	—	1,050
Technical Officers and Chemists	275	×	18	—	455
		×	25	—	580
Technical Officers and Chemists on more responsible individual work	580	×	25	—	680
Senior Technical Officers and Senior Chemists ...	680	×	25	—	800
Principal Technical Officers and Principal Chemists ...	850	×	30	—	1,050

(Broadly speaking the "Scientific" grades are employed on Research and "Technical" grades on Development. The "Chemist" grades are employed analysis and inspection work, and also on explosives production).

Above this level come posts, described most frequently by titles such as Superintendent and Assistant Director, on the scale £1,050 × 30 — £1,250, and a variety of senior posts on salaries ranging from about £1,150 to £1,750 (plus, in one case, official residence).

During the war recruitment of temporary staff into all these grades takes place at the discretion of the Departments within the following maxima:—

	£
Technical Officers and Chemists	550
Scientific Officers	650
Senior Scientific and Technical Officers and Senior Chemists	800
Principal Scientific and Technical Officers and Principal Chemists	1,000

Large increases in the complements at all levels have taken place in the Defence Departments, and allowances have been granted to certain higher posts. For example, the Directors of Scientific Research in the Admiralty, Ministry of Aircraft Production and Ministry of Supply have been given allowances of £200 in addition to the normal salary of £1,700.

5. All the evidence before us points to one main conclusion, that the Government failed in peace-time to attract into and retain in its service a proper proportion of the best scientists produced by the Universities. Although Government Departments, like similar departments in industry, do not require more than a certain percentage of first-class men among their scientists, the present situation, in which in general the Universities and industry obtain as compared with the Government an unduly high proportion of the best scientific talent available, is one which must be remedied. The fault seems to us to lie partly in the standards of remuneration and the prospects of promotion offered, but at least as much in general conditions of service and the relations between Government Research organizations and the scientific world outside.

6. *Remuneration.*—In general it appears that for scientists of average ability (of whom any large scientific organization is bound to require a substantial number) the prospects offered by Government employment at any rate up to a certain level have not compared unfavourably with those offered in most Universities and in industry for men of like ability. We understand that in industry special war increases of pay have been widely given; if these should continue after the war, the position may be considerably altered and the general scales of pay will have to be reconsidered. At the present stage, however, we have no special comments to offer upon the pay and prospects of the scientist of average ability.

7. It is in regard to the man of more than usual ability that improvement is necessary. It seems to us to be a first essential that the scales and system of promotion of the scientific classes should ensure that the best scientific men should have equal prospects of pay and promotion with the best men in the administrative class at least up to the top of the Principal grade. The question can be considered under three heads, namely, initial salaries; advancement in the early years; and ultimate prospects. It must be made clear that the recommendations made in the following sub-paragraphs are based upon the assumption that the general standards of remuneration in the Government Service remain substantially unaltered. It should be assumed without question that scientific staff would participate in any general movement in salaries throughout the Service, if post-war conditions were such as to bring this about.

8. *Initial Salaries.*—There has been some divergence of practice between Departments in implementing the Carpenter Report. The Report (paragraph 28) indicates that, while post-graduate research is not an indispensable qualification for the Junior Scientific Officer grade, it is a desirable one. Some Departments appear to have regarded this as implying entry at the minimum of the scale (£275) even for candidates with post-graduate research qualifications, and have interpreted strictly the Committee's provision for entry above the minimum "in exceptional cases." Other Departments on the other hand have taken a more flexible view of their authorities, and have usually offered starting rates above the minimum to candidates with post-graduate research. Whatever may have been the intention of the Carpenter Committee, we consider that for the future Departments should be prepared to offer salaries above the minimum of the scales to candidates who have spent one or two years in post-graduate research. In exceptional cases the existing provision for recruitment direct into the Scientific Officer grade could be utilized. The J.S.O. grade is essentially a recruiting and probationary grade, and should be used for that purpose; men who have passed their probation should not be retained in it.

Further, it would be an advantage if, in addition to the above two channels of normal recruitment, there could be a regular scheme of recruitment direct to the entific Officer grade at a later age. A convenient method of achieving this would be to have an examination consisting of an interview and the submission of theses and publications together with names of referees. Some such standards as those laid down by the Commissioners for the 1851 Exhibition might be provisionally adopted. This examination would have to be held under the aegis of the Civil Service Commission, who would no doubt call in outside scientists as assessors. Successful candidates would be distributed amongst the various Government services according to need and enter the Scientific Officer grade in those departments.

9. *Advancement in the Early Years.*—One point, on which those whom we have consulted have been practically unanimous, is the necessity of providing rapid advancement for outstanding men. This seems to us a matter of great importance, and we have considered various possible ways of bringing it about. One method would be to divide the Scientific Officer scale in two, but this would have the effect of accelerating the best men while diminishing the prospects of the ordinary man, who is at present assured of a straight run from £400 to £680. There might be advantages in this, though it might not commend itself to the Institution of Professional Civil Servants. A second method would be to extend the existing authority possessed by Departments to give special jumps on the scale to a certain number of outstanding Scientific Officers, Technical Officers and Chemists each year. The number of cases per year allowed to be treated in this way has been strictly limited (e.g., in the Admiralty three cases per year or about 2½ per cent.) and it has been a condition that the special increase should not operate to take a man's salary immediately above £454 (the practical effect of this is to limit eligibility for these special jumps to Scientific Officers with less than three years' service in the grade and to restrict within narrow limits the scope of the increases). In our view this second method is in principle the one to be adopted. It has the practical advantage of being an extension of an existing practice, but we think that the method should be made more flexible in operation and be extended in application both by removing the limit of £454 and by giving more latitude in the number of special advances to be allowed each year.

The above arrangement should provide greater scope for special advancement for the outstanding man in his first few years. It would, of course, be reasonable to expect that men specially selected for entry as Scientific Officers (see paragraph 8 above) would as a rule qualify for the special increases—though always in competition with their fellows.

10. The problem of securing rapid advancement beyond the Scientific Officer grade for the outstanding scientist is primarily one of complementing, i.e., of so regulating the proportion of higher to lower posts as to ensure reasonable prospects of promotion. For the career to prove sufficiently attractive to the University Graduate of more than usual ability, it must be possible for him to have a reasonable expectation of reaching the Principal Scientific Officer grade in the early thirties, and arrangements must be made with this end in view. This carries with it the following implications:—

(i) Full use should be made of the recommendation of the Carpenter Report under which a research officer should be able to reach the Principal Scientific Officer grade on his merits as an individual investigator even if he is lacking in capacity for organising and directing the research work of others. The Treasury should be ready to authorise special additional posts (i.e., on a personal basis) in the Senior Scientific and Principal Scientific Officer grades to enable early promotion to be given to the outstanding man. In the really exceptional case it might be necessary to contemplate promotion direct from Scientific Officer to Principal Scientific Officer.

(ii) The Treasury will be justified in requiring in return some form of guarantee that any special posts so authorised will in fact be filled by scientists of genuinely outstanding promise, and this assurance could, we consider, be provided by stipulating that the concurrence of the inter-Departmental panel referred to below should be obtained before the special additional posts are approved.

(iii) This arrangement may well provoke discontent among the less well-qualified officers who have to proceed at a more leisurely pace, but Departments must be prepared to face this. They and the Treasury have to a limited extent the remedy in their own hands. The Royal Commission on the Civil Service (paragraphs 196 to 198) recommended consideration of the reduction in numbers in the bottom grades as a means of securing adequate career prospects, with the corollary that work should be devolved on trained staff with long experience but without approved professional or technical qualifications. We are not satisfied that this recommendation has been carried out and we recommend that the point should be followed up in the settlement of post-war complements.

We realise that the proposal that additional higher posts should be created meet special promotion problems runs counter to general Civil Service principles, but it seems to us that it could be justified by reference to the very special nature of scientific research work, since in this field it is more difficult than in the ordinary Civil Service hierarchy to assess posts in terms of their intrinsic weight rather than in terms of the special capacity of the persons occupying them.

11. While we recommend that the system of special advancements referred to in paragraphs 9 and 10 should be tried, some of us have doubts whether it will work in practice so effectively as to achieve the objects in view, and think that it may prove necessary to adopt an alternative arrangement whereby side by side with the ordinary Scientific Officer hierarchy, there should be a separate class of scientist with scales of pay identical (at any rate in the earlier stages of the career) with those of the Administrative Class. Membership of this new class would be restricted to persons who had taken the examination referred to in paragraph 8 above, and to such members of the ordinary "Carpenter" Officer grades as have shown special ability. It is argued that this would mark out the outstanding men for favourable treatment in a way which the proposals for special advancement within the existing hierarchy might not secure. Some of us, however, feel that it would be unworkable to have two classes of employee working side by side with each other but with different pay schemes, unless some clear distinction could be made between the functions of the two classes (as is made for example between the work falling to the Administrative and Executive Classes respectively); and moreover, that such a proposal would be bound to depress the quality of recruitment in the normal way through the Junior Scientific Officer Channel. We are all agreed that the target to be aimed at is that stated in paragraph 7.

12. We recommend for consideration the institution of an inter-Departmental scientific panel, consisting of the heads of the scientific directorates or departments and possibly also of establishment officers, before which would be brought at regular intervals proposals for the exceptional promotions and advancements described above. Such a panel would help to ensure that the system was effective and to secure uniformity of standards, would enable each head of department to know something of the most promising men in other departments and would facilitate inter-departmental transfers (see paragraph 15 (*g*)). Moreover, anything which helped the heads of scientific departments to a fuller knowledge of the work done in other departments would in itself be of value.

13. *Ultimate Prospects.*—In industry a scientist who proves his ability has a chance of attaining to a post carrying remuneration greatly in excess of Government standards, though such posts are relatively few in number. At some of the Universities scientists have the opportunity of adding substantially to their salaries in the way of fees, e.g., as consultants or examiners. Scientists in Government Departments have few such opportunities, and the ultimate prospects, even for the best of them, compare unfavourably with those open to University graduates who have adopted a career in the administrative class of the Civil Service. We do not propose that the Government should endeavour to compete with industry in the higher ranges of salary or that the salary of the top scientific and administrative posts should be equated. But it is clear as a practical matter that the gap between the salaries attaching to the highest administrative and scientific Government posts should be narrowed. A limited improvement in the scientific salaries has taken place during the war and the process should be extended in peace-time.

A further improvement in scientists' prospects could be achieved by a more frequent transfer of suitable scientists to the Administrative Class. There is no bar to such transfers under the present system, but they have been very few. It is considered that, if transfers of this kind were more frequent the business of Government might well benefit from the introduction of a different outlook, particularly in Departments whose work is concerned with scientific and technical processes, and wider avenues of promotion would be opened up for scientists. There is no doubt that the possibilities open in industry to men recruited as scientists to transfer to more lucrative posts on the administrative and commercial sides offer considerable attractions to some young scientists. Though the scope for such transfers within the Government Service may prove in practice to be limited, we think that more should be done than at present to open this avenue of advancement to scientists who have shown capacity for a wider field of administration. It may be necessary to set up some central machinery to ensure that scientists serving in Departments without any administrative cadre of their own should be considered for transfer to administrative vacancies in other Departments.

14. Before leaving the question of remuneration, we must touch on a question which has been raised with us, but into which we have been unable to go deeply enough to make any firm recommendation. The Carpenter Report discriminated between "Scientific" grades on the one hand and "Technical" and "Chemist"

grades on the other. The view has been put to us that this distinction should be abolished, and that Technical Officers and Chemists should be paid on as favourable a basis as Scientific Officers. In certain Departments, the distinction between "Technical" and "Scientific" work is not clearly drawn. Again, it is urged that Development work is of greater importance than formerly. On this our view is that there should be the closest contact between Research and Development and that a high standard of recruitment is of almost as great importance on the Development (or "Technical") side as it is on the Research (or "Scientific") side. It does not appear to us that the present system, whereby Technical Officers and "Chemists" serve on a single scale running from £275 to £580 (i.e., a 15 years' scale), is a good one. These long scales may well encourage indifference and damp down keenness, and, whatever the merits of the claim for equal treatment with the Scientific Officer, it might be of advantage to split both the Technical Officer and the Chemist grades into two parts. The description "Chemist" seems somewhat misleading and might be discontinued.

15. *General Conditions of Service.*—One of the dangers to which in the nature of things a Government Scientific Branch is liable is the tendency towards isolation from the rest of the scientific world. This not merely has an effect upon the value of the work of such Branches, but acts as a hindrance to recruitment. Young scientists, ambitious to obtain recognition for their work and to keep abreast of new developments, are discouraged from embarking upon a career which appears to remove them from contact with the Universities, with learned societies and with the research side of industry. The prospect of a closer relationship with the outside scientific world would remove one of the impediments which weigh with the University authorities in the advice whch they offer to their students on the choice of a career.

This "isolationist" tendency is one which in our view should be eliminated to the greatest practicable extent. The following are expedients which may be helpful to that end:—

(*a*) The development of extra-mural research contacts between Government Departments and the Universities over the past few years has proved of great benefit. Heads of Scientific Departments should endeavour constantly to improve and strengthen those contacts. They should take every step to interest both potential recruits at the Universities and the authorities in the work of their Departments, whether by lectures or in more informal ways.

(*b*) An attempt should be made to develop a system of temporary inter-changes of staff, particularly during the early stages of their career, between Government Departments and the Universities. One effect of such a scheme would be to impart new vigour into the work of the Government establishments.

(*c*) The Committee attach great importance to the introduction of a scheme on the lines of a "Sabbatical Year" under which selected scientific staff would be allowed a period or periods of special leave to go and work at a University or other institution at home or abroad at the expense of the Department which employs them.

(*d*) Departments should be empowered and encouraged to give staff special leave (with pay) to enable them to attend meetings and conferences of a scientific character.

(*e*) Similar close contacts with industry would be almost as desirable, although here certain difficulties are bound to arise. Firms will be anxious that trade secrets should not be divulged, and Government Departments will naturally wish to avoid not only the possible leakage of official secrets but also the appearance of favouring one firm as against another in the form of close contact with Government work. No doubt, there are other difficulties such as the fear of losing staff seconded to industry (though this might be lessened by an improvement in the conditions of service such as we suggest), or again the reluctance to spare good men for a purpose which will not necessarily bring immediate advantages, however much it may prove beneficial in the long run. We are not convinced that these difficulties are insurmountable. If they can be overcome, the Government Service would benefit from such exchanges.

(*f*) It should go without saying that Government Scientific Branches should keep in the closest contact with each other. The contact is, we believe, already close on programmes of research, but it has been suggested to us that in matters of administration, and in particular staffing questions, liaison is too often effected indirectly through the central Establishment Branches of the Departments concerned. Central control of staffing matters by the Principal Establishment Officer of a Ministry is a fundamental feature of the Public Service, but methods should be evolved to bring scientific "administrators" in touch with each other without impairing that control.

(*g*) While we would not go so far as to recommend a unified State Scientific Service with a single Establishment and responsible to a common head, transfers of staff from one Department to another appear to us to be very desirable. Such transfers have become increasingly frequent in other fields in the Civil Service with good results. The effect, so far as individual scientists of ability are concerned, would be to enlarge the field of possible promotion; there might be a corresponding diminution in the prospects of "sitting tenants," but this would have to be faced. We consider that the advantages of a scheme of relatively free transfer would outweigh the disadvantages.

(*h*) It has also been suggested to us that a defect in organization in certain Departments is that an individual scientist is not able to follow through to its conclusion the development of a particular line of research which he has initiated. We regard it as most important that wherever it is practicable (and it obviously is not always so) researchers, and in particular the younger men, should when personally suitable remain associated with the development of projects which they themselves started. We know that the Directors of Scientific Research whom we have consulted appreciate the value of the encouragement which can be given in this way, but its importance merits more general acceptance.

(*i*) An important point in regard to research establishments, which may easily be overlooked, is their geographical location. It would be of great advantage if research stations could be situated within easy reach of a University or other centre of intellectual life. Moreover, it would be desirable to secure close proximity between different estalishments working on kindred research problems. It should also be made easy for individuals at any level in the hierarchy to make direct contact with their opposite numbers in other establishments.

(*j*) One of the greatest disadvantages of Government Scientific Service is the extreme emphasis upon secrecy. This has, we believe, been a powerful factor in hindering recruitment. It operates adversely in two ways. It makes it difficult or impossible for the Government worker to enter into discussion with similar workers outside, and it prevents his obtaining recognition in the scientific world of the value of his work. It must be remembered that scientific ideas are rarely the product of a single brain; they arise from the contact and clash of separate minds. Both flint and steel are needed to produce the spark. If the Government condemns its scientific workers to a life of monastic seclusion, it will inevitably suffer from a paucity of new ideas. We recognise that the relaxation of secrecy restrictions is a difficult matter, particularly in relation to the work of the Defence Departments. Nevertheless it is most important that they should be relaxed, and we recommend as a possible solution an arrangement on the following lines:—

(i) It should not be assumed as a matter of course, at any rate in peace-time, that the whole of the work of a Research Establishment must automatically be regarded as secret;

(ii) Matters of fundamental research should be regarded as prima facie suitable for discussion with outsiders;

(iii) The questions on which absolute secrecy is prescribed (such as the development of particular secret devices) should be kept to the minimum;

(iv) If, as we hope, there is to be a greater liaison with outside institutions, the head of a Research Establishment should have discretion, and indeed be encouraged, to allow his staff to discuss their work confidentially with any members of those institutions who are engaged on similar problems;

(v) A system should be possible whereby members of the staff engaged on secret work could submit theses for higher degrees. Certain Universities already provide for this.

(*k*) We think that fuller use might be made of Advisory Councils. It should not be enough that they should meet three or four times a year to consider a miscellaneous agenda. Their members should be encouraged and expected to visit the laboratories and discuss the work with the staff. We believe that the effect on the staff of such discussions and of the feeling that an eminent man from outside knew what they were doing would be most stimulating.

Alternatively, the method might be tried of appointing either a single paid consultant or a panel of specialists who would give a substantial amount of time to visiting the laboratory and talking to the staff. This would not preclude an Advisory Council concerned mainly with the general programme and policy of the institution.

(*l*) Departments should make a regular practice of inviting eminent scientists to give lectures to their staff. The institution of "colloquia" would also be of value. It has been pressed on us that better facilities in the way of lecture-rooms and libraries are much needed.

16. We have gained the impression from various quarters that one of the factors that make scientific work in the Service Departments unattractive to prospective candidates is the control of civilian scientific staff by officers of the Fighting Services. The extent to which such control exists varies. There have, we understand, recently

been changes in the Ministry of Supply, which will have the effect of giving the control of certain aspects of research to highly-qualified civilian experts. How far it will be possible to extend this development during and after the war we cannot judge. We were told that in the Air Ministry (and subsequently the Ministry of Aircraft Production) control of civilian scientists by uniformed officers is not found to any appreciable extent, and that this has almost certainly favourably affected recruitment. Clearly it is difficult to generalise on a matter of this kind, but the prospect of working under the control of uniformed officers does act as a deterrent to recruitment. It is obviously important that representatives of the user Services should be available to give advice to research and development staffs, but their rôle ought in general to be as expert advisers to, rather than direct controllers of, the civilian scientists and engineers.

17. We have heard criticisms of a rather vague kind regarding the prevalence of "red-tape" in Government scientific establishments. One criticism however is specific; it is that the heads of the various laboratory units are not given sufficient freedom to purchase materials and laboratory equipment. We recommend that Departments should discuss with the Treasury whether heads of units cannot be given greater freedom in regard to the purchase of at any rate minor or standard equipment and materials, possibly within an annual allocation of money. Allied with this is the suggestion that workshop facilities are unduly centralised. It is urged that the research worker should have within easy reach of his laboratory an adequately equipped workshop where he can get made quickly and under his own eye (or with his own hands) such rough and ready apparatus or alterations to existing apparatus as he requires for the immediate working out of his ideas. Centralization of such facilities in a single workshop, though it may produce some economy in equipment and labour, inevitably involves delay and irksome procedure for indenting and requisitioning, the effects of which, it is claimed, greatly outweigh the economy secured. There appears to us to be much force in this criticism.

18. *Summary of Recommendations.*—Our recommendations may be summarised as follows:—.

(i) The scales and system of promotion of the scientific classes should ensure that the best scientific men should have equal prospects of pay and promotion with the best men in the administrative class at least up to the top of the Principal grade. (Paragraph 7).

(ii) Departments should be prepared to offer initial salaries above the minimum of the Junior Scientific Officer scale to candidates with research experience. (Paragraph 8).

(iii) Provision should be made for regular recruitment to the Scientific Officer grade at a later age by means of an examination similar to that applied by the 1851 Commissioners. (Paragraph 8).

(iv) The existing authority to give special advances within the scale to a limited number of "Officers" should be extended. (Paragraph 9).

(v) The outstanding man should be able to reach the Principal Scientific Officer grade in the early thirties. Full use should be made of the Carpenter Committee's recommendation under which promotions to Senior and Principal Scientific Officer may be made by reference to outstanding individual work. The Treasury should be ready to grant special extra posts, but may require that the nomination for any such special post should be approved by the Inter-Departmental Scientific Panel (see (vii) below). Departments ought to improve general promotion prospects by regulating the numbers in the bottom grades. (Paragraph 10.)

(vi) While we recommend that the system of special advancements referred to at (iv) and (v) above should be tried, some of us think it may prove necessary to institute a separate class of scientists with scales of pay identical (at any rate in the earlier stages of the career) with those of the administrative class. Some of us, however, consider that this would be unworkable. (Paragraph 11.)

(vii) An Inter-Departmental Scientific Panel should be set up to maintain a uniform standard for the special advancements and promotions referred to at (iv) and (v) above, and to improve administrative liaison between the separate departments. (Paragraph 12.)

(viii) The salaries of the highest posts on the scientific side of the Government Service should be increased; this would also have the effect of narrowing the gap between the pay of such posts and that of the higher posts on the administrative side. (Paragraph 13.)

(ix) The possibility of more frequent transfers of suitable scientists to the administrative class should be considered. Special steps may have to be taken to ensure that scientists serving in Departments without any administrative cadre of their own should be considered for administrative vacancies in other Departments. (Paragraph 13.)

(x) There should be the closest contact between research and development. A high standard of recruitment is necessary on the development side. It might be of advantage to split into two parts the present long scales for both Technical Officers and Chemists. The designation "Chemist" might be discontinued. (Paragraph 14.)

(xi) The tendency of Government Scientific Branches to isolation from the rest of the scientific world must be eliminated (paragraph 15). Possible methods of doing this are:—(*a*) Extra-mural research contacts to help to that end. Heads of Scientific Departments should try constantly to improve contacts with both University authorities and students. (*b*) Temporary interchanges of staff with the Universities should be arranged. (*c*) The introduction of a scheme on the lines of a sabbatical year is very desirable. (*d*) Scientific staff should be given special leave to enable them to attend scientific meetings and conferences. (*e*) Exchanges of staff with industry would be valuable, if the difficulties can be overcome. (*f*) Direct contact between Government Scientific Branches particularly in matters of administration is needed. (*g*) Transfers of scientific staff from one Department to another are desirable. (*h*) Research scientists should, wherever practicable, remain associated with projects which they themselves have started. (*i*) Research Establishments ought, so far as possible, to be located within easy reach of a University or intellectual centre and in close proximity to other establishments working on kindred problems. Direct contact at all levels between the staff of different establishments should be made easy. (*j*) Secrecy restrictions appear to be excessive and should be relaxed. (*k*) Fuller use of the members of Advisory Councils should help to secure professional recognition of the work of Government Scientists. A wider extension of the admission by Universities of theses for higher degrees on secret subjects would be valuable. (*l*) Lectures by eminent scientists and "Colloquia" should be encouraged, and adequate lecture-rooms, libraries and workshop facilities should be provided.

(xii) Control of civilian scientific staffs by uniformed officers tends to be prejudicial. Uniformed officers should act as advisers on behalf of the user Services rather than as direct controllers of research and development. (Paragraph 16.)

(xiii) Heads of Laboratory Units should be given more freedom in regard to the procurement of equipment. (Paragraph 17.)

Signed on behalf of the Committee,

J. A. BARLOW.

23rd April, 1943.

LONDON
PRINTED AND PUBLISHED BY HIS MAJESTY'S STATIONERY OFFICE
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APPENDIX II

The Functions and Organisation of the Meteorological Office

1. Functions of the Meteorological Office

The Meteorological Office is the State Meteorological Service. It is responsible for meeting the requirements of the following :-

General Public
Royal Air Force
Army
Civil Aviation
Government Departments

It also provides basic information to the Naval Meteorological Branch of the Admiralty.

The Meteorological Office is further responsible for :-

(a) the collection, publication and distribution of meteorological information from all parts of the world;
(b) the organisation and distribution of magnetic and seismological information from certain British observatories.
(c) research in meteorological and geophysical subjects.

2. General Organisation

The Meteorological Office forms part of the Air Ministry, the Director being responsible to the Secretary of State for Air through the Permanent Under-Secretary of State. Use is made of the administrative machinery of the Air Ministry (e.g. Finance, Works, Contracts) in the day to day work of the Meteorological Office.

General policy control is exercised by the Meteorological Committee, of which the Under-Secretary of State for Air is Chairman. The members consist of representatives of practically all the Government Departments for the meeting of whose requirements the Meteorological Office is responsible. It also includes representatives of the Royal Society and of the Royal Society of Edinburgh.

3. Internal Organisation

(a) The internal organisation of the Meteorological Office is in process of changing over from the war-time organisation to that required for peace-time purposes. The approximate organisation at the present time is shown in the chart at the end of this memorandum.

(b) The Director is assisted by a Deputy Director and five Assistant Directors. Each Assistant Director is responsible for a number of Branches.

(c) The Deputy Director is in charge of those sections of the Office immediately concerned with synoptic meteorology and the supply of forecasts to the Services, Civil Aviation, Government Departments and the public. Under him are three Assistant Directors: Forecasting, Home Operations, Overseas Operations.

(d) The Assistant Director (Forecasting) is in charge of the Central Forecasting Office at Dunstable and is responsible for the collection and distribution of synoptic data, the issue of basic forecasts, and investigation into technical problems of weather forecasting. Dunstable also supplies the weather forecasts broadcast regularly by the British Broadcasting Corporation; a detached Section is located in London to provide information to the Press and general public.

/(e)

(e) The Assistant Director (Home Operations) is responsible primarily for meeting the meteorological requirements of the Royal Air Force, Army and Civil Aviation at home (i.e. within Great Britain).

(f) The Assistant Director (Overseas Operations) is responsible for satisfying the meteorological requirements of the Royal Air Force and Civil Aviation overseas.

(g) The Assistant Director (General) is responsible for all personnel matters and for works services, finance, etc. and he is also normally in charge of the Climatology, Marine and Instrument Branches. But in view of the magnitude and complexity of personnel questions during the war, it was decided that he should give his whole attention to these matters and that the charge of the three other Branches mentioned should fall to the Assistant Director (Research) for the time being. This arrangement still continues but it will shortly be terminated.

(h) In general, each Branch of the Meteorological Office carries out investigations and research into its own particular problems. The Assistant Director (Research) is responsible for co-ordinating all research within the Meteorological Office and for carrying out investigations which do not fall naturally to any of the Branches. He attends to any matters connected with the Meteorological Research Committee (See Section 7) and is responsible for liaison with all outside bodies on questions relating to research and development. He als controls all the observatories of the Meteorological Office.

4. Organisation of the Forecasting System in Great Britain

(a) The Central Forecasting Office at Dunstable is the hub of the Meteorological Office forecasting system in Great Britain and is designed to meet the needs of all Departments and Services.

At this Office the observations, British and foreign, are collected by teleprinter, telephone, telegram and radio. They are distributed by teleprinter and radio. Analyses, appreciations of the meteorological situation and forecasts are prepared and broadcast, and serve to co-ordinate the meteorological advice given to the Services, civil aviation and other users throughout Great Britain.

(b) Major Forecasting Offices (Type 1) are attached to the principal Service and civil flying centres, which include Command and Group Headquarters of the Royal Air Force.

Each Major Forecasting Office provides the information and advice required at its own station, and in many cases acts as "parent" to a number of subsidiary meteorological offices at stations under its control. The forecasting staff at Major Forecasting Offices are experienced personnel who are qualified to originate and issue forecasts without reference to higher authority. Close liaison is, of course, maintained with Dunstable.

(c) Subsidiary Forecasting Offices are of three kinds :-

(i) At important places, which do not conveniently come under a Major Forecasting Office, a team of "independent" forecasters* is provided. (Type 2).

(ii) Airfields controlled by a Major Forecasting Office are normally provided with a meteorological Office (Type 3), comprising "dependent" forecasters* who supply forecasts under the technical guidance of their "parent" office. For making observations and plotting charts both Type 2 and 3 offices carry complements of assistants* in addition to the forecasters.

(iii) Type 4 meteorological offices are staffed by assistants* only who make observations and obtain any forecasts required at their airfields from their "parent" office. The assistants explain the significance of technical terms used in forecasts and reports, but do not discuss the technical basis of forecasts.

---

*For a definition of these terms see Section 6.

(d) The Meteorological Office has its own teleprinter network which is the primary method used for the collection and distribution of meteorological information within Great Britain. The teleprinter network has its centre at the Central Forecasting Office, Dunstable.

From the Central Forecasting Office two direct teleprinter channels go to each Type 1 station. One of these, called "First Channel", runs to the Type 1 station and thence to the subsidiary meteorological offices under it. The other line, called "Second Channel", does not go beyond the Type 1 office. The First Channel is used for general broadcasts to all meteorological stations in the teleprinter network. Most stations can both receive and transmit, but at a few stations reception facilities only are provided. Besides the direct lines to Type 1 offices from the Central Forecasting Office there are direct channels to certain Naval Meteorological Offices.

The following is a brief summary of arrangements for collecting and broadcasting on the First Channel:-

> Between hour-minus-5 minutes and the hour, each Type 1 station collects the observations made at each of its subsidiary stations ("tails"). Between the hour and hour-plus-10 minutes, the Type 1 station transmits all the reports to the Central Forecasting Office and to all its "tails" simultaneously. During these periods no broadcasting from the Central Forecasting Office takes place. From hour-plus-10 to hour-plus-33 minutes, the Central Forecasting Office broadcasts the British surface observations and priority Continental reports to all stations. During the rest of the hour there are broadcasts at fixed times, varying from hour to hour, of upper wind and temperature observations, foreign observations, aircraft observations, reports from ships, forecasts and analyses. In each hour there are brief periods called "breaks" during which there is no broadcasting and which are used for transmitting urgent technical reports from stations or urgent administrative messages.

The Second Channel from the Central Forecasting Office to Type 1 stations is used partly for broadcasts of additional or special information and partly for urgent administrative messages. If Type 1 stations wish to transmit to "tails" any of the information received on the Second Channel they have to retransmit it to them during "breaks".

Information from North America is received via Prestwick and transmitted direct from Prestwick (at high speed) by teleprinter to Dunstable and to a number of Type 1 stations.

(e) Meteorological observations made at non-Meteorological Office stations such as lighthouses, Royal Naval Shore Signal Stations (Coastguards) and posts of the Royal Observer Corps are telephoned to the nearest Type 1 station for transmission to the Central Forecasting Office.

(f) Meteorological information is broadcast by W/T for the use of meteorological offices overseas, H.M. Navy and, as necessary, of meteorological offices at home.

There is also a point-to-point exchange of meteorological information and forecasts between those meteorological offices in the United Kingdom and overseas responsible for Transatlantic and other long distance flights.

5. Some technical facilities provided for forecasting

(a) Radio Sonde

Radio-sonde observations of pressure, temperature and humidity (Radio-thum) are made four times daily at seven stations widely separated.

The soundings often reach 30 mb. (about 80,000 feet) while the average level attained is about 80 mb. (about 57,000 feet).

(b) Radio-wind

Radio-wind observations are made simultaneously with radio-thum at most of the stations referred to in para. 5(a) above; they are made also at one other station. The levels to which wind observations extend are about the same as for radio-thum.

(c) Observations from aircraft

Three classes of special aircraft flights are employed for obtaining meteorological information, viz :-

(i) Medium altitude. Vertical ascents to 400 mb. (24,000 ft. approximately) 3 or 4 times daily.
(ii) Medium or high altitude reconnaissance flights as necessary.
(iii) Medium and long range reconnaissance over the sea, with vertical soundings between the surface and 500 mb. (18,000 feet approximately) once or more on each sortie; sorties generally twice daily.

The observations are sent in special code to the Central Forecasting Office which broadcasts them.

Additional information regarding these flights is given below :-

(i) Medium Altitude Aircraft Ascents - Observations of temperature and humidity are taken at an altimeter height of 500, 1000 and 1,500 feet, above the airfield and thereafter at 950, 900, 850 ..... 450, 400 mb. Observations of weather, clouds, visibility and ice formation are made in addition.

(ii) Medium or High Altitude Reconnaissance Flights - These are special flights made to obtain information regarding weather over an extensive area or in relation to a specific route for operational purposes. Dry-bulb temperature readings are taken, but the main purpose is to obtain information about the position of fronts, cloud types and amounts, visibility, upper winds and ice accretion.

(iii) Medium and Long Range Reconnaissance Flights over the Sea - Sorties are normally made twice daily on tracks up to 700 nautical miles from base. A substantial part of each track is flown at a level of 950 mb. (500 ft. to 2,500 ft.), while "vertical" ascents from near-surface to 500 mb. (18,000 ft.) and, on long range sorties, "vertical" descents from 500 mb. to near-surface, are made at an appropriate point or points on track. If both a "vertical" ascent and descent is made on a sortie the flight between the positions of sounding, normally 200 to 300 miles, is made at the 500 mb. level. If one sounding is made the aircraft loses height gradually on track. Meteorological observations are made at 50 nautical mile intervals throughout the sortie, at intermediate positions as necessary, and at 50 mb. intervals on ascents and descents.

(d) Location of Thunderstorms.

The position of thunderstorms is located at standard times by radio direction finding apparatus installed at the Central Forecasting Office and at three other stations widely separated. Simultaneous observations are made of the bearing of atmospherics from each of these stations. The readings are communicated immediately to the Central Forecasting Office, where the positions are plotted and broadcast to all stations. The radius of action is some 1,500 miles.

(e) Measurement of Visibility at night

Since 1938 the visibility at night has been measured with the visibility meter designed by Mr. E. Gold. Three 15-watt lamps are proveded on airfields for use with the meter, viz. one at 100 yards from the observation point, the others at 500 yards and 1,500 yards approximately. The meter consists of a rectangular strip of glass whose obscurity varies linearly from one end to the other, and along which there slides a small strip of glass whose obscuring power varies linearly in the opposite sense to the large strip. The observer looks at the light and moves the slider until the light is obscured. The slider moves over a scale from the reading of which the visibility is obtained.

For a full account of the method reference should be made to the paper "A Practical Method of Determining the visibility Number V at Night" (Quarterly Journal of the Royal Meteorological Society, Volume LXV, April, 1939).

(f) Measurement of Cloud Height at Night

Cloud height is measured at night at airfields by means of cloud searchlights. This instrument consists of a small searchlight of 500 watts power projecting a vertical beam of light. The angle of elevation of the spot of light so produced on the cloud base is measured with an alidade fixed at a point at least 1,000 feet away from the searchlight. From the angle of elevation the height of the cloud base is at once read off from a table.

6. Operational staff

This section defines the terms "independent forecaster" etc., used in the description of the organisation in Section 4(c) above.

The staff on the synoptic side of the Meteorological Office consist of :-

(a) independent forecasters;
(b) dependent forecasters;
(c) assistants

Independent forecasters are qualified to originate forecasts from the synoptic charts and other material (upper air information etc.). They are guided as to the general lines of their forecasts by the analyses, etc. issued by the Central Forecasting Office.

Independent forecasters normally hold a University degree in physics or mathematics.

There are independent forecasters at Types 1 and 2 stations.

Dependent forecasters are stationed at Type 3 stations and receive forecasts from the Type 1 station. They receive the synoptic data and draw charts, which they use in explaining the forecasts and discussing them with aircrews.

The minimum technical qualification required in a dependent forecaster is the Intermediate B.Sc., (or equivalent) with physics or mathematics.

Assistants make observations, attend to recording instruments, make pilot balloon ascents and plot weather maps.

Independent and dependent forecasters, and assistants are also employed as meteorological air observers in Meteorological Reconnaissance Squadrons, and a special section (the Meteorological Air Observer Section) of the R.A.F. General Duties Branch has been formed for this purpose.

7. Research

As already stated (Section 3), each Branch of the Meteorological Office carries out investigations and research into its own particular problems.

The direction and co-ordination of this work is undertaken by the Meteorological Research Committee, whose composition is as follows :-

Chairman: Professor S. Chapman, M.A., D.Sc., F.R.S.
Vice-Chairman: Dr. G.M.B. Dobson, M.A., D.Sc., F.R.S.
Members : Professor D. Brunt, M.A., Sc.D., F.R.S.
Professor Sir Geoffrey Taylor, M.A., Sc.D., F.R.S.
Sir Charles Normand, M.A., D.Sc.
Director of the Meteorological Office.
Director of the Naval Meteorological Service.
Director of Scientific Research, Ministry of Aircraft Production.
Representative of the Air Staff.
Representative of the Ministry of Civil Aviation.

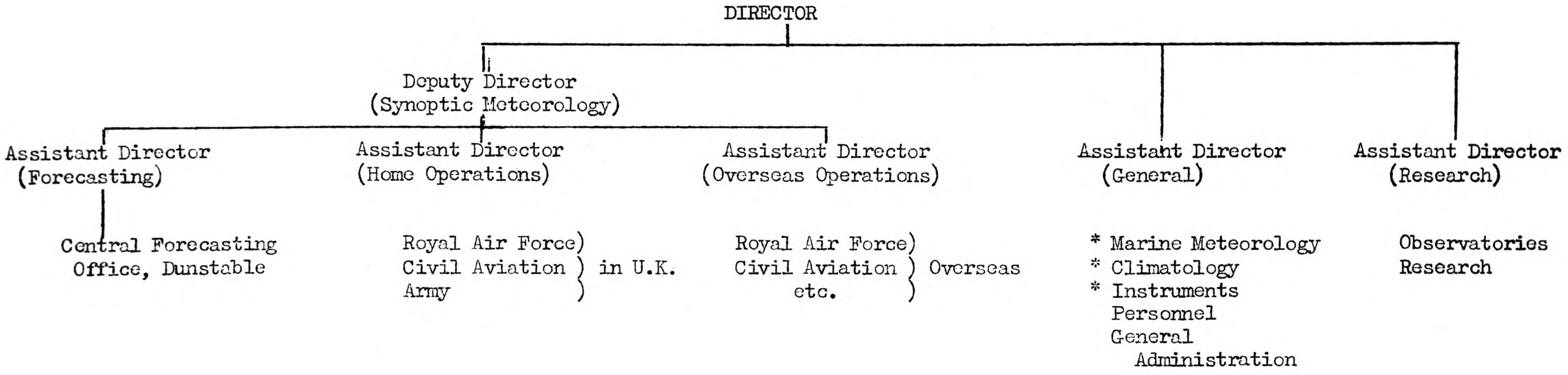
Scientific reports submitted to the Committee are published from time to time in the Proceedings of the Royal Society and other scientific journals.

Arrangements have been made with the Royal Society by which the latter undertakes research into meteorological problems of a more purely scientific and long-term character, thus leaving the Meteorological Research Committee free to concentrate upon practical and applied problems.

N.K. JOHNSON

Director

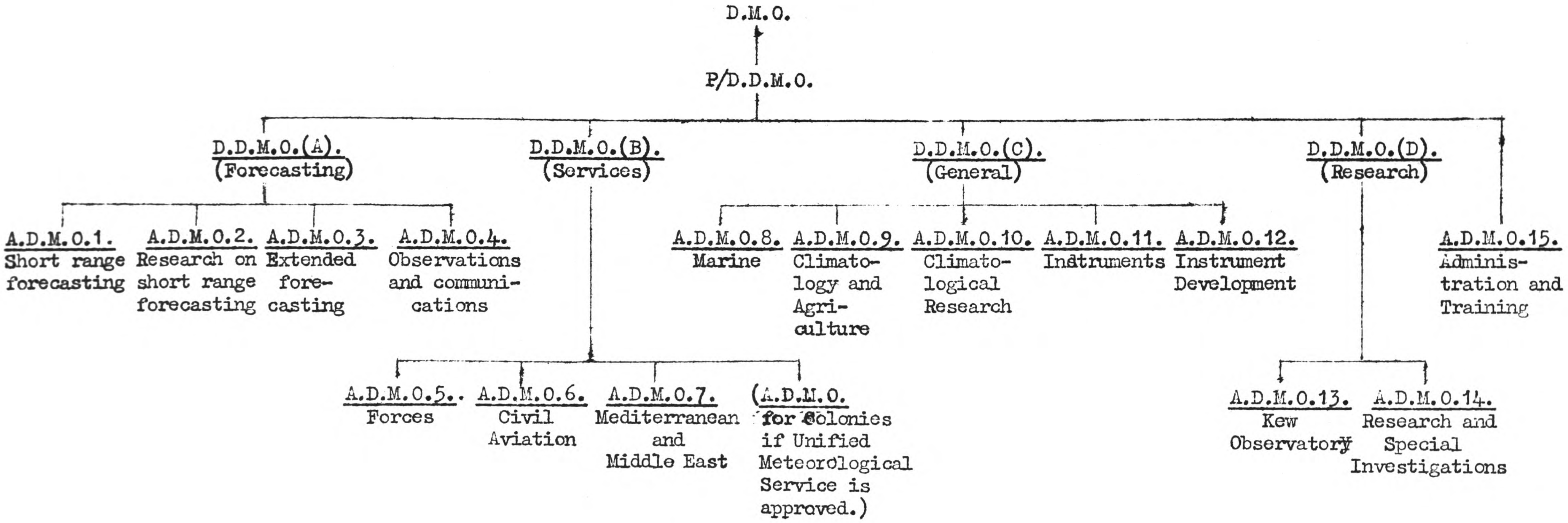
Meteorological Office,
AIR MINISTRY, London, W.C.2.
February, 1946.


DIRECTOR
Deputy Director
(Synoptic Meteorology)
Assistant Director
(Forecasting)
Central Forecasting
Office, Dunstable
Assistant Director
(Home Operations)
Royal Air Force)
Civil Aviation) in U.K.
Army)
Assistant Director
(Overseas Operations)
Royal Air Force)
Civil Aviation) Overseas
etc.)
Assistant Director
(General)
* Marine Meteorology
* Climatology
* Instruments
Personnel
General
Administration
Assistant Director
(Research)
Observatories
Research

* These three Branches are temporarily controlled by the Assistant Director (Research).
(See Section 3(g)).

APPENDIX III.

Reorganisation of the Meteorological Office.


D.M.O.
P/D.D.M.O.
D.D.M.O.(A). (Forecasting)
D.D.M.O.(B). (Services)
D.D.M.O.(C). (General)
D.D.M.O.(D). (Research)
A.D.M.O.1. Short range forecasting
A.D.M.O.2. Research on short range forecasting
A.D.M.O.3. Extended fore-casting
A.D.M.O.4. Observations and communi-cations
A.D.M.O.5.. Forces
A.D.M.O.6. Civil Aviation
A.D.M.O.7. Mediterranean and Middle East
(A.D.M.O. for Colonies if Unified Meteorological Service is approved.)
A.D.M.O.8. Marine
A.D.M.O.9. Climato-logy and Agri-culture
A.D.M.O.10. Climato-logical Research
A.D.M.O.11. Instruments
A.D.M.O.12. Instrument Development
A.D.M.O.13. Kew Observatory
A.D.M.O.14. Research and Special Investigations
A.D.M.O.15. Adminis-tration and Training

NOTES.

(1) Eskdalemuir and Lerwick Observatories report direct to D.D.M.O.(D).
(2) Edinburgh Branch Office reports direct to D.M.O. or P/D.D.M.O.

P/D.D.M.O. = Principal Deputy Director.
D.D.M.O. = Deputy Director.
A.D.M.O. = Assistant Director.

AIR MINISTRY.

METEOROLOGICAL COMMITTEE

A Brief History of the Meteorological Office.

The Meteorological Office evolved from the Meteorological Department of the Board of Trade, which was formed in 1855 "for the discussion of meteorological observations made at sea in all parts of the Globe".

2. The first Superintendent, Admiral FitzRoy, extended the functions of the Department by initiating regular weather reports from a network of land stations, employing for the purpose the recently invented electric telegraph. By their aid he issued Storm Warnings to certain ports for the benefit of seamen, and he also commenced the practice of "forecasting". In 1863 the name of the Department was changed to the "Meteorological Office".

3. In 1867, two years after FitzRoy's death, the Meteorological Office was transferred from the Board of Trade and placed under the administrative control of a Meteorological Committee, the members of which were appointed by the Royal Society. A "grant in aid" was assigned by the Treasury, the Committee being responsible for the administration of the grant.

4. Ten years later (1877), a Treasury Committee reviewed the arrangement, and as a result the Meteorological Committee was replaced by a paid Council of six members, of whom the Hydrographer was one, and the remaining five were nominated by the Royal Society. Mr. Scott, who had been Director of the Meteorological Office since 1867, assumed the dual role of Director of the Office and Secretary of the Meteorological Council.

5. No change took place in this arrangement until 1905 when, following the recommendation of another Treasury Committee, the Meteorological Office was placed under the management of a reconstituted Meteorological Committee composed as follows :-

The Director of the Meteorological Office (Chairman).
Two members nominated by the Royal Society.
The Hydrographer of the Navy.
One member nominated by the Board of Trade.
One member nominated by the Board of Agriculture and Fisheries.
One member nominated by the Treasury.

The Committee was responsible for administering the "grant in aid" provided by the Treasury, but the Director was responsible for the day-to-day administration of the Meteorological Office

During this period the Meteorological Office developed steadily, and by 1914, its internal organisation was as follows :-

1. Marine Branch.
2. Forecast and Storm Warning Branch.
3. Statistics and Library Branch.
4. Observing Branch.
5. Instruments Branch.
6. Correspondence and Accounts Branch.

6. The administrative regime outlined in para. 5 above continued until 1919, by which time the situation had become complicated by developments which had taken place during the Great War of 1914-18. At the end of the war there were four meteorological services in existence, viz :-

(a) The Meteorological Office.
(b) The Meteorological Service of the Air Ministry.
(c) The Meteorological Section, Royal Engineers.
(d) The Meteorological Service of the Admiralty.

/ The .....

The Meteorological Service of the Air Ministry was responsible for the supply of information for airships, the Meteorological Section, R.E., had been formed to meet the requirements of aircraft and gas warfare in France, whilst the Admiralty service had been developed to meet the needs of H.M. Ships during the war.

The unco-ordinated development of these four services inevitably resulted in serious duplication and overlapping, and a sub-committee of the Research Committee of the Cabinet was appointed, under the chairmanship of Mr. H.A.L. Fisher, to recommend in what way these various services could best be co-ordinated. Their report, which was approved by the Cabinet, advocated that the three younger services should be absorbed into the Meteorological Office, which should become "a central State Meteorological Service". The Cabinet also decided that the reconstituted Meteorological Office should be attached to the Air Ministry.

The Sub-Committee's report further recommended that there should be a "Board of Management" of the Meteorological Office comprising representatives of the Admiralty, the War Office, the Air Ministry and other State Departments concerned in meteorology, together with a number of scientific members. For this purpose, the Meteorological Committee was reorganised with the constitution and functions shown in the appendix to this note.

7. There have been only two changes since 1919. In 1923 the post of Controller-General of Civil Aviation was abolished, and the Air Council decided that the Under-Secretary of State for Air should act as Chairman of the Meteorological Committee. Until the outbreak of war in 1939, the Meteorological Committee met regularly and dealt with questions of general policy and major matters connected with the administration of the Meteorological Office.

8. The second change which has taken place since 1919 is the transfer, in 1937, of the administrative functions of the Naval Division of the Meteorological Office to a new Naval Meteorological Branch of the Hydrographic Department of the Admiralty. The Treasury letter authorising this transfer laid down that "the scientific functions of the Naval Division shall remain at the Meteorological Office", and that "the proposed transfer will not in any case result in the setting up now or in the future of a second organisation in parallel with the Meteorological Office, or in the performance by the Hydrographic Department of duties requiring the employment of scientific or technical staff (other than those lent by the Meteorological Office for specific purposes of instruction or administration) or the use of laboratories or technical establishments".

9. From the foregoing summary it will be seen that the Meteorological Office is the central State Meteorological Service. In this capacity, it is responsible for meeting the meteorological requirements of the community generally and all Government Departments, except in so far as the Admiralty are now responsible for the administration of the Meteorological Branch under the Hydrographer. The Government Departments and other bodies served by the Meteorological Office include the following :-

- Air Ministry.
- Ministry of Civil Aviation.
- War Office.
- Admiralty.
- Ministry of Supply and Aircraft Production.
- Home Office.
- Scottish Office.
- Ministry of Agriculture & Fisheries.
- Ministry of Transport.
- Ministry of Health.
- Ministry of Fuel and Power.
- Department of Scientific and Industrial Research.
- Medical Research Council.
- Geological & Hydrographic Surveys.
- Agricultural Research Council.
- British Overseas Airways Corporation and civil aviation generally.
- British Broadcasting Corporation.
- Public utility undertakings, e.g.
  - Railway companies.
  - Electricity boards.
  - Steamship companies.
  - Tramway companies.
- Local authorities.
- Royal Automobile Club and Automobile Association.
- Business concerns.
- Private individuals.
- Metropolitan Water Board.
- River Board.

/ Co-ordination ....

Co-ordination of the various interests is secured through the medium of the Meteorological Committee, of which the composition and functions remain as described in paras. 6 and 7 above.

The Meteorological Office, as the State Meteorological Service, is responsible for representing the British Government on the International Meteorological Organisation and in international matters generally. It is also the sole official channel of communication with overseas meteorological services - Empire and Foreign.

10. The above paragraphs do not attempt to give more than the broadest outline of the manner in which the present organisation has been evolved. Full details can be found in the following series of publications :-

Reports of the Meteorological Department, Board of Trade.	1857-1864.
Reports of the Meteorological Committee of the Royal Society.	1867-1876.
Reports of the Meteorological Council to the Royal Society.	1877-1905.
Reports of the Meteorological Committee.	1905-1920.
Annual Reports of the Meteorological Committee to the Air Council.	1920-1927.
Annual Reports of the Meteorological Office.	1928-1938.

Minutes of Proceedings of Meteorological Committee.	1867-1877.
Minutes of Proceedings of Meteorological Council.	1877-1905.
Minutes of Proceedings of Meteorological Committee.	1905-1938.

APPENDIX.

Constitution and Functions of the Meteorological Committee.

1. The Meteorological Committee shall be constituted as follows :-

1 The Controller-General of Civil Aviation (Chairman).
1 Director of the Meteorological Office (ex officio).
2 Representatives nominated by the Air Ministry (including one for Finance).
1 The Hydrographer of the Navy representing the Admiralty.
1 Representative nominated by the War Office.
1 " " " " Ministry of Agriculture & Fisheries.
1 " " " " Board of Trade.
1 " " " " Colonial Office.
2 " " " " Royal Society.
1 " " " " Royal Society of Edinburgh.

(A Secretary shall be appointed by the Chairman).

2. The Director of the Meteorological Office shall be appointed by the Air Council.

3. The Controller-General of Civil Aviation shall act as Chairman of the Committee, and shall be responsible as a member of the Air Council for reporting to that Council. In his absence a Vice-Chairman, elected for the ensuing year by the Committee and selected from among the representatives of the Royal Society and the Royal Society of Edinburgh at the last ordinary meeting in each year, shall take the Chair.

4. The members of the Committee shall be appointed by the Air Council, and, subject to the discretion of the authorities by which they are respectively nominated, will hold office for a period not exceeding five years; but will be eligible for re-appointment.

5. The members of the Committee will not receive remuneration for their services, but travelling and subsistence expenses will be allowed in the case of members not residing in the Metropolis.

6. The Chairman shall call six ordinary meetings each year, and such extraordinary meetings as he shall consider necessary. The dates of the ordinary meetings in each year shall be approved at the last ordinary meeting of the preceding year. The notice of any extraordinary meetings, together with the Agenda to be transacted at such meeting, shall be circulated not less than a week before the date of the meeting.

7. The Committee shall :-

(i) Receive the Annual Report prepared by the Director and, if approved, transmit it to the Air Council.

(ii) Consider and, if approved, transmit to the Air Council the financial programme in connection with the estimates for the coming year, and decide upon any important modifications of the programme which may be found desirable during the course of the year.

(iii) Review the scientific and observational activity of the Office, and consider such proposals as may be submitted to them by the Director for experimental work, the establishment of observatories or stations, and the allocation of staff to be employed.

(iv) Delegate, by special instructions to be recorded in the minutes, such functions as they may think fit to the Director of the Meteorological Office, or to any Sub-Committee appointed for a special purpose.

(v) Appoint Assistant Directors and Superintendents, after consideration of the recommendations of the Director.

/ (vi) .....

(vi) Submit annually to the Committee, appointed by the Council of the Royal Society under the Gassiot Trust, proposals respecting the allocation of the income from the Trust for magnetic and meteorological observations or other physical investigations in accordance with the Trust.

8. The Director of the Meteorological Office will act generally as adviser to the Committee on all meteorological and geophysical subjects, and shall be responsible for :-

(i) The administration of the Office and the execution of the duties delegated to him by the Committee.

(ii) The appointment of all members of his staff, other than those referred to in 7(v) above.

(iii) The issue of all meteorological publications authorised by the Committee.

(iv) Bringing before the Meteorological Committee for their consideration, all matters of importance relating to the application, progress and development of the Science of Meteorology in which the Meteorological Service might share.

(v) Referring to the Finance Department of the Air Ministry proposals for expenditure to be incurred by the Office before submission to the Committee.

THE

DEPARTMENT OF METEOROLOGY

Published by
The Institution of Professional Civil Servants
17 Hans Place
LONDON, S.W. 1

SYNOPSIS.

A brief history of the Meteorological Office is given.

The community at large would reap great benefits by the development of the science of Meteorology.

Results would be most efficiently and rapidly obtained by the setting up of a State Meteorological Service independent of any one consumer interest and including the Colonial Meteorological Service. At its head there should be a Director-General directly responsible to the Lord President of the Council.

The personnel of the Department should be dominantly civilian and under civilian control.

Recruitment of personnel should be central and full qualifications should be insisted upon.

All staff should be given adequate training throughout their careers.

Research should become a vital part of the Department's activities occupying at least as high a place as operational requirements.

THE DEPARTMENT OF METEOROLOGY

A Memorandum prepared by the
Meteorological Office Branch of the Institution
of Professional Civil Servants.

I—Brief History of the Meteorological Office (1854-1945).

On June 15th, 1854, the Board of Trade informed the Royal Society that it proposed to set up a Department for the discussion of Meteorological observations made at sea, and early in 1855 a Meteorological Office was established with Admiral Fitzroy as Superintendent. Its functions may be briefly summarised as follows:—

(*a*) By means of trustworthy observations to determine the normal values of barometric pressure; temperature; and aqueous vapour content of air.

(*b*) To study the variability of each of these for suitable geographical regions.

(*c*) The establishment of stations for the continuous record of wind at certain places overseas.

It may, however, be mentioned as a matter of interest that weather maps, based on telegraphic intelligence, were constructed for the 1851 Exhibition.

It soon became evident that the immediate usefulness of the growing Department depended on the communication of reports from wide areas as quickly as possible. Thus by 1860 there was daily communication of weather reports to London and exchange of weather reports with European countries. The issue of meteorological information to the daily papers also began at this time.

The effort to demonstrate the potential usefulness of the Department to the people at large now began. In 1861 the gale warning system was inaugurated and the issue of forecasts to the Press commenced.

Interest was awakened but it was natural that progress should be but steady. This new and most difficult science of meteorology depended immediately on advances in the fields of Physics and Mathematics and its laboratory was very wide.

The next development came in 1877, when the work of the Office was placed under the control of a meteorological council appointed by the Treasury. This council consisted of six members, of whom five were nominated by the Royal Society, the remaining seat being held *ex-officio* by the Hydrographer of the Navy.

The build up was in the main gradual, but not until 1903 was the office recruiting staff with scientific attainments. Noteworthy progress in the consolidation and development of the work of the office was made during the years 1910–1915. In 1910 the office was transferred to more suitable accommodation at South Kensington. In 1911 a lithographic press was installed and this greatly facilitated the issue of information to the public. Also at this time a new development was taking place in which meteorology had evidently to play a major role—Aviation. The establishment of a branch office at South Farnborough for the assistance of aircraft pilots attached to the Royal Aircraft Factory marked the beginning of the work for this user interest.

Then came the Great War, greatly increasing the scope and work of the Meteorological Office which had sections working in France, Italy and North Russia. The main result for the office was that it brought to the forefront, in clear relief, the immense importance of the weather not only in the operations of the Defence Forces, but also for the needs of the general public.

The result was that in 1919 a research committee of the War Cabinet under the chairmanship of H. A. L. Fisher, made, among others, the following recommendations :—

1. The provision for the Meteorological Office to be so increased as to enable it to function as a Central State Meteorological Service.
2. The Admiralty, War Office and Air Ministry should be represented on the Board of Management of the Meteorological Office with other State Departments for whose operations meteorological information is required and with members selected in respect of special knowledge of meteorological science.
3. The Meteorological Office should be removed from South Kensington so as to be within easy reach of its user interests.

Unfortunately, however, this ideal of a Central State Meteorological Service controlled by a Panel of representatives from its user interests was not to be realised. In pursuance of a decision of the Home Affairs Committee of the War Cabinet, the administrative control of the Meteorological Office passed into the hands of the Air Ministry as from July 1st, 1919.

It was natural now that, although other user interests continued to be served in the best possible fashion, the emphasis was to be on aviation. The first result of this was the splitting of the Meteorological team in 1937 when the work of the M.O. Naval Division was transferred to the Admiralty.

By now the work of the office was on a wide basis. Very numerous observations taken on land, sea and in the air throughout each 24 hours were being transmitted to National Central Offices by the quickest possible means. They, in turn, broadcast a selection by wireless telegraphy, with a minimum of delay, for interception by other countries according to a highly organised time-table. The observations were used primarily for the production of short-term forecasts. The aviator began to be satisfied ; for the aeroplane did not fly for long periods. But the problem of long-range or seasonal forecasting was as yet almost untouched ; the main body of meteorologists in this country being employed in developing short-term forecasting technique. Research was for practically all meteorologists a spare-time occupation.

This war has served again to emphasize the importance of weather. The Office has been of inestimable use to the Air Arm because of the developments it has made since the last war in the technique of short-range forecasting. It has met to the best of its ability the demands for longer forecasts from the forces on the land. But had there been wider opportunities in the between war years for a broad attack on the long-range forecasting problem the science might have given tremendous aid to the easing of the problems of agriculture and industry—to name but two.

II.—The Need for a Unified Meteorological Service, and for a separate Meteorological Service, independent of any consumer interest, directly under the Lord President of Council.

Broadly speaking, the work of the Meteorologist may be divided into two branches—the pure scientific investigation work and the applied work designed to be of immediate service to the community. The applied work is mainly of a forecasting and climatological nature, forecasting at present being largely synoptic short-period forecasting ; but in the future demands will arise for longer range and seasonal forecasts.

The two branches of the subject are closely related and no real boundary line can be drawn between them. One fact is of vital importance—both branches are dependent on the collection and arrangement of observations and consequent deductions from these observations. In this respect, meteorology is akin to other sciences, but the meteorological laboratory is far larger than that used in most sciences.

Meteorology depends for its development and day-to-day working on observations collected from the surface of the earth, from the oceans and from the upper atmosphere above the sea and land. This mass of observational material must be rapidly collected and distributed in order that the synoptic forecaster may efficiently carry on his work.

At a later stage, the same information is of course used by the research and development worker, the climatologist, etc. It should be remarked that the rapid transfer of information is so vital to the service that every effort should be made to incorporate into meteorological communications all the latest developments that may be of use.

In modern forecasting practice, the synoptic forecaster is interested in practically the whole of the information collected from his own hemisphere. It is easily seen that the rapid collection and distribution of observations is one of the major problems of meteorology and one which can be solved only by a high degree of international co-operation. This international co-operation over meteorological questions has existed now for nearly three-quarters of a century and meteorologists may well claim to have set an excellent example to other organisations in the principle of international agreement.

Prior to the outbreak of war the work of the International Meteorological Organisation in its various branches was almost unceasing. Questions of all sorts were dealt with such as hours of observations, codes, methods, times, wavelengths for W/T transmissions, etc. The international agreements which were reached on these questions were fundamental to the smooth running of a peace-time meteorological service and, indeed, many of the decisions have been of the utmost value in the efficient working of the Allied War Meteorological Organisation. During the war, advances in meteorological technique and methods have been rapid; and again in peace the International Organisation will be of the utmost importance to the science of meteorology.

The representatives from the British Meteorological Office have always played a leading part in the affairs of the International Meteorological Organisation. This is due largely to the fact that the Meteorological Office has, to all intents and purposes, had control of meteorological development in this country. It has, therefore, been comparatively simple for Great Britain to obtain rapid decisions on matters raised internationally and to give a lead at Conferences. Any system giving rise to numbers of sectional meteorological interests in the country would undoubtedly prove a handicap in international affairs and lead to the loss of efficiency both nationally and internationally.

Just after the close of the Great War the principle of a State Meteorological Service for Great Britain was accepted by the Government. The Meteorological Office was placed under the control of the Air Ministry, but it was the duty of the Director to meet the meteorological requirements of the country as a whole—*i.e.*, the Defence Services, Civil Aviation, Agriculture, Shipping, the Press, etc. Broadly speaking, it may be said that during the twenty-year period between the wars this system functioned satisfactorily. It was inevitable to some extent that the Air Ministry, being the controlling authority, should tend to be more interested in the meteorological claims of aviation than in the claims of other sections. That this happened cannot be denied, but nevertheless the requirements of other bodies and departments were never neglected, and it may be accepted that twenty years' experience during a particularly formative period in meteorological science has shown that the principle of the State Meteorological Service is correct. The only alternative to the State Meteorological Service, catering for all Government Departments and Sections of the public, would be a number of independent Departmental Services. For example, on ground of interest, meteorological services might be set up by each of the three fighting Service Departments, by the Ministry of Civil Aviation, the Ministry of Agriculture and Fisheries, the Board of Trade, the Ministry of Information and the Colonial Office. Hence, unless the principle of the State Meteorological Service is accepted, it is easy to envisage seven or eight small services being run, one for the benefit of each interested party. Such a system would inevitably produce chaos in an organisation depending so much for smooth working on central national control and international agreement.

Accepting the fact that a State Service is necessary, it has to be decided which Department is to be made responsible for the control of such a service. Reference was made above to the fact that, during the inter-war years, the Air Ministry tended to give more consideration to the meteorological claims of aviation than to the claims of other user interests. No mere transfer of control from one user interest to another is likely to overcome this disadvantage. Any Government Department responsible for the control and finances of a State Meteorological Service is likely to give more weight to its own immediate requirements than to the needs of other user-interests and to general development problems. It is essential, therefore, to find some Minister who can view in a disinterested manner the meteorological claims of all user interests. In the absence of any " State Scientific Service " or " Ministry of Science," the best solution would seem to be to place the Meteorological Office under the direct control of the Lord President of the Council. It has now been accepted that this Minister is generally responsible for the supervision and co-ordination of the scientific services of the country. In view of the many responsibilities of the Head of the Meteorological Service, it is suggested that he should be given the rank of Director-General and should have direct access to the Lord President of the Council. The title Director-General has been chosen because it is in keeping with the titles given to Heads of Meteorological Services of other countries.

III.—The Need for a Combined United Kingdom-Colonial Meteorological Service.

A strong case can also be made for a combined United Kingdom-Colonial Meteorological Service. Prior to hostilities the general practice was for the Colonies to maintain their own Meteorological Service, with the aid, in some cases, of grants from the Mother Country. The officer class was often drawn from or trained by the United Kingdom Meteorological Service and served under Colonial Office regulations, whilst the assistant class was usually recruited directly by the Colony either from United Kingdom or from the local population. The disadvantages of this system are many and have been further emphasized by the demands of the fighting services during the war. In no case has the Colonial Service been able to meet the demands placed upon it by aviation, and the United Kingdom Service has had to expand and augment the local service at a time when it fully required its own resources.

It has been recognised, by the restriction of the length of tours of duty overseas in war-time that no man can remain at his maximum efficiency for long in other climates. Yet, under the pre-war method, the Meteorological personnel in the Colonial Service had to serve long periods abroad with but little leave, in order to ensure their pension rights. Again, at a time when meteorology in other climes was a vital factor for the successful prosecution of the war by the maintenance of a satisfactory service to aviation, it was found that the problems special to those regions had hardly been touched. Officers experienced in weather forecasting abroad were few, for the inability of the poorer Colonies to maintain a large staff precluded an adequate flow of scientists through their services.

Aviation has opened up many backward and as yet poorly developed regions which must be provided with a first-class meteorological service. This can best be done by uniting all the Colonial Services with that of the Mother Country. A steady flow of alert and energetic scientists, ready to attack the many problems, in particular agricultural developments, would thus be maintained, and would ensure satisfactory conditions of service. Details of the scheme require careful consideration but it might be observed that the regions fall geographically into five main areas, viz. :—(1) W. INDIES, (2) W. AFRICA, (3) MIDDLE EAST, (4) EAST AFRICA, (5) PACIFIC AND S.E. ASIA. If the efficiency of the service is to be maintained at the high level which post-war conditions will demand, tours of duty must be laid down and strictly observed.

IV.—Interchange with Dominions.

It is recognised that the self-governing Dominions will have their own Meteorological Services. Nevertheless in order that the meteorologist could gain first-hand experience of the weather in these Dominions and the areas in which they are situated, it would be advantageous to have interchange of staff between the Home and Dominion Services on occasions. The Dominions might also arrange to have interchange of personnel. There should be close liaison between the various Services.

V.—General Structure.

The foregoing paragraphs have demonstrated the wide and important service meteorology could give to man in all his activities ;

that this service could be given most efficiently by a separate department independent of any consumer interest, and that the department at home should embrace the Colonial Meteorological Service.

Consideration will now be given to the general structure of the Department.

It is considered that the head of the Department of Meteorology should be a Director-General with a salary of the order of £3,000 per annum. This salary is comparable with that obtaining for Heads of Departments. The title Director-General is suggested in place of the normal title of Permanent Secretary, in view of the fact that Director is the normal title of the Head of a State Meteorological Service, which forms a section of the International Meteorological Organisation.

The Director-General should be assisted by an adequate Directorate.

The executive and administrative work of the Department below the directorate level should be divided into divisions, and within each division there should be branches dealing with the different aspects and facets of the work in that division.

It is considered that in the immediate future 16 divisions would be required, one for each of the following :—

ROYAL NAVY
WAR OFFICE
ROYAL AIR FORCE
CIVIL AVIATION
AGRICULTURE
INDUSTRY
COLONIES
CENTRAL FORECAST UNIT
PUBLIC RELATIONS
SUPPLY
GENERAL CLIMATOLOGY
RESEARCH
ESTABLISHMENT AND FINANCE
MERCHANT NAVY AND MARINE
COMMUNICATIONS
TRAINING.

Proposals specifying branches within divisions are appropriate to detailed structure of the Department of Meteorology rather than to general structure.

VI.—Personnel.

Having due regard to the 16 divisions referred to in the preceding paragraph, and to the diversity of work to be performed, it has already been proposed that there is a need for a unified meteorological service. It is considered that the most efficient service would be provided by a Department with a predominantly civilian staff.

For various reasons, the Chiefs of Staff of the Armed Forces may desire that meteorological officers attached to units under their command should be in uniform. To meet these requests, it is suggested that meteorological officers, whilst attached to such units, should wear uniform under certain conditions of service, these conditions being determined by the appropriate Departments. The opinion that some officers should be attached to certain of the Services for the whole of their career is one which is thought will tend to make the outlook of those officers stereotyped. It would retard the growth, development and interchange of new ideas and theories with other divisions. Any difficulties involved in a civil servant wearing uniform and becoming a member of the Armed Forces for a temporary period are not considered insuperable, and it is thought that conditions of service, acceptable to both parties, can be arranged.

The divisions of the Department of Meteorology dealing with the needs of the Armed Forces are only about one-fifth of the whole number of divisions. Civilian staff will most certainly be used to staff the 13 non-service divisions and, on numerical grounds alone, it is desirable to have a wholly civilian staff. Some members of the basically civilian staff, at certain stages of their career, and while filling appointments in the various Service Departments, will wear uniform temporarily, but will not resign their civilian appointment.

VII.—Recruitment.

The method of recruitment should be through a Central Board under the ægis of the Civil Service Commissioners.

Regarding recruitment to the Scientific Officer class a special problem arises. A proposal has been put forward for a Meteorological Research Institute, financed by the Universities Grants Board, and the research students of this Institute must expect entry into the Meteorological Service. The question arises how large the intake from this source should be. It may be presumed that these students would, by virtue of their specialised knowledge of the problems of the Meteorological Service, gain a position on the statutory register of officers maintained by the central Recruiting Board and carry their recommendation to the Meteorological Service Recruiting Board.

In contrast it would be unnecessary for the Central Board to maintain a statutory register of persons suitable for entry into the class below Scientific Officer for which class we shall use the term " Meteorological Officer " in this document, pending a decision on nomenclature. In passing it may be stated that there should be no recruitment into the Meteorological Officer class of persons with pass degrees.

In the immediate post-war period there will be a dearth of candidates from outside the Civil Service with first-class academic qualifications. It is recommended that the gap be bridged by the selection of suitable candidates for the Scientific Officer class from the present assistant and temporary classes, both within the Meteorological Office and in other Government Departments, subject to the full recruitment procedure outlined above without any lowering of the high academic standards laid down—namely, a first or good second class honours degree. Recruitment to the Meteorological Officer class should present no difficulty but must be in the basic grade ; otherwise the age distribution in this class will be such that adequate promotion prospects cannot be maintained.

VIII.—Training of Personnel.

Having recruited suitably qualified personnel into the office, the next question which arises is training. It is not proposed to enter into any detailed training programme here, but certain principles may be laid down.

The one aim of a scientific establishment should be that training never comes to an end. This is especially necessary in the Meteorological Office, which has two functions :—

(1) The advance of meteorology as a branch of Natural Science.

(2) The application of the knowledge gained under (1).

Incoming entrants into the Scientific Officer grade should have a fairly prolonged period of initial training. They must first become fully familiar with the work of the lower grades—both by training at a central establishment and working for a short period at out-stations. With this equipment they can then return to the central establishment and undergo a course of some months in theoretical work and the practical application of the knowledge gained. They should then be ready for a tour of various divisions in the office, this time in order to appreciate the full work of these divisions. Only in this manner can they obtain a wide outlook on the work undertaken throughout the office and be placed finally in the most suitable division.

After this training period, and provided an officer reaches a certain standard, he should be promoted and enter fully into the work of the division in which he is placed. This does not mean that his training would end here. His duties would be expected to include research and adequate provision should be made for him to keep abreast of all developments in his own and kindred subjects in order that he might aid in the general advance of his science. Thus facilities should be afforded for the fullest possible contact between him and scientists outside the service both in universities (by Sabbatical Year on occasions) and in industry. Only by such contacts can he be kept informed of the directions in which he might serve the nation, and acquire the necessary knowledge to make that possible service a reality.

We come now to entrants into the Meteorological Officer class

These entrants should be offered an adequate career within this class and it should not be a main part of the inducements to service that opportunities exist for promotion from class to class. Such opportunities must exist, and indeed there should be no barrier preventing the promotion of anyone, in however junior position he or she enters the service, to the highest posts in that service. Nevertheless, promotions to posts above the Meteorological Officer class must be gained in the nature of events by a comparatively small percentage.

It is of importance to emphasize this because training must not consist of inducing people to engage in a scramble for a limited number of promotions by performing arduous work outside official hours. The correct angle from which to view the problem of training this class is to accept that the majority will remain within the class, and to consider training appropriate to this situation.

This does not mean that training would be very limited. A keen and lively Scientific Officer grade must be aided by an efficient and understanding Meteorological Officer grade able to assimilate and perform work formerly undertaken by the Scientific Officer as advances in the science render this practical.

Entrants to the Junior Meteorological Officer grade should at first have a course on the work of this grade both at a central establishment and at first hand at out-stations. When they are ready to perform independently the duties of this grade their training should not be interrupted for long periods by being left on these duties for years. Although the performance of these duties is their main task for their earlier years, they must be trained to perform the work of higher grades. Some scheme should be devised whereby the meteorological officer entrants could be trained not only in meteorology but at first in more advanced work in the subjects on which it depends—mainly physics and mathematics. Periods of training should occur most frequently in the early years ; its main aim being to provide a well-trained class able to give full assistance to the Scientific Officers ; and as they advance in passage of time in their own class, to take over some of the duties of the class above. It should also be accepted that the training should allow some entrants to attain class to class promotion — facilities being provided if necessary for such men or women to have university courses.

IX.—Research.

Some reference may now be made to research in Meteorology.

Before the war the emphasis in the Meteorological Office was on operational duties ; that is the practical application of that part of existing meteorological knowledge with which the meteorologist had been enabled to keep in touch. Any research was largely undertaken in spare time and no organised research arrangements existed.

This is clearly a very bad arrangement, being almost the reverse of what should apply in a developing subject. Operational needs will progressively be more fully met when and after arrangements have been made to advance meteorology by research.

As has been seen before the aim of the Meteorological Department should be :—

(1) The advancement of Meteorology.

(2) The practical application of the advances made.

Advances must be made in Pure Meteorology to continue the build up of the subject. But on the operational side problems will arise according to the needs of the various divisions of the office and the demands placed on them by their user interests.

It appears then that some structure such as the following is required :—

(1) A Research Division where, amongst other things, research into the fundamentals of Meteorology would be carried out.

(2) To each appropriate division of the Meteorological Service there should be attached a Research Section engaged primarily in meeting the problems arising from demands made on that division by its user interests. Each of these research sections would have a fluid complement with men passing from operational duties to periods of research only. The operational tours would give them the means of formulating their problems at the same time as they were discharging the day-to-day demands made on them ; the research periods giving them the opportunity to come to grips with these problems.

There should of course be close liaison between the various research sections and the Research Division. This latter should be the hub of all things Meteorological, the spring of all Meteorological advance. It would be an establishment where Meteorologists could work together and attain the true research atmosphere ; giving opportunities for discussion with other scientists and the pooling of ideas which so often yield advance. It would have not only its own research programme but also full cognisance of the problems facing other divisions. It would maintain contact with other research bodies both at home and abroad, and in particular with the proposed Institute of Pure Meteorology. It would have a complete library of meteorological and kindred matter. It would arrange the publication of research results and generally ensure that the office was kept informed of all developments in the subject.

July, 1945.

Printed by
LAWRENCE BROS. (Weston-super-Mare) LTD.
(T.U.) WESTON-SUPER-MARE

M.C.-3.

METEOROLOGICAL COMMITTEE
AIR MINISTRY

Provision of Meteorological Services in the Colonies.

Prior to the war the Meteorological Services of the Colonies were for the most part small organisations, but during the war were mostly brought under Air Ministry control. Recent developments in the technique of meteorology and the demand for increased meteorological facilities for aviation and other purposes have given rise to a number of problems relating to the future organisation of those services.

2. The limited scope of promotion in the small Colonial Meteorological Services has in the past made it difficult to attract good men. The climate has in some cases been an additional deterring factor. Lack of contact with research and developments in the outside world may also have made good men hesitate to join the Colonial Meteorological Service.

3. In an attempt to overcome some of these disabilities, a scheme has been formulated for bringing the various Colonial Meteorological Services under the control of the Meteorological Office of the Air Ministry. The scheme visualises a series of Regions, each under a Regional Director possessing a large measure of autonomous power. Members of the professional staff would be interchangeable with the staff of the Meteorological Office, both in the United Kingdom and in other parts of the Colonial Empire. Any officer would thus be eligible for promotion to any post in the entire organisation, whilst interchange of staff would be beneficial both to the Colonial Services and to the parent Service.

4. Much time has been spent in endeavouring to frame a scheme which is likely to be acceptable to the Colonial Governments, both on financial and other grounds. The scheme has been drafted by representatives of the Meteorological Office and the Colonial Office, in consultation with the Treasury. As soon as it has received formal Air Ministry and Colonial Office approval, it will be referred to each of the Colonies concerned, for their acceptance or rejection. It is hoped that implementation of the scheme in respect of those Colonies which are prepared to accept it will occur some time during 1947.

Meteorological Office,
Air Ministry, Kingsway, W.C.2.
September, 1946.

M.C.-4.

METEOROLOGICAL COMMITTEE.

Air Ministry.

Meteorological Research.

An important development since the last meeting of the Meteorological Committee has been the setting up by the Secretary of State for Air of a Meteorological Research Committee. A brief account of this matter is given in the accompanying reprint of a recent article in the Royal Meteorological Society's publication "Weather".

Copies of the current Research Programme and of the Meteorological Research Committee's last Annual Report are available if any Members of the Meteorological Committee wish to see them.

N. K. JOHNSON.

September, 1946. D.M.O.

Reprinted from 'WEATHER,' *May* 1946.

METEOROLOGICAL RESEARCH

By Sir NELSON K. JOHNSON, K.C.B., D.Sc.,
Director of the Meteorological Office, London

"The wind bloweth where it listeth." Although some meteorologists would probably claim that we have progressed to a stage where the old adage is no longer apposite, few will be found to deny that the science of meteorology bristles with unsolved problems. Many of them are fundamental problems, the answers to which are essential before we can hope to understand a whole series of less fundamental, but still very important, questions.

For some purposes it is convenient to divide meteorological research into "private" research and "organized" research. As to the importance of the former there can be no doubt. Many of the most valuable contributions to science have been made by individual investigators working by the light of their intuitive genius, and it must never be forgotten that the quality of the results obtained in any kind of research must depend in the last resort upon the intellectual ability of the investigators.

But there are certain types of investigation which require for their effective prosecution a certain amount of "organization". This is obviously true in the case of problems which demand the use of aircraft or extensive workshop facilities. It may even be true in the case of a purely scientific investigation. Many complex problems can be broken down into a number of distinct but inter-related problems, and machinery must be provided for ensuring the necessary progress in each of the individual problems; otherwise, the solution of the major problems may be indefinitely delayed owing to lack of information on one vital point.

There is thus a need for both types of research, and it is thought that a brief outline of the arrangements which have been made for carrying out "organized" meteorological research in Great Britain may be of interest. At the same time, an indication will be given of a few of the investigations that are in progress.

Shortly before the war steps were taken to form a Meteorological Research Committee, but it was not until 1941 that it actually came into being. It forms part of the Air Ministry and its members are appointed by the Secretary of State for Air. According to its official terms of reference, the Committee's duties are :—

(*a*) To advise the Secretary of State for Air as to the general lines along which meteorological research should be developed.

(*b*) To advise and assist in the carrying out of investigations and research within the Meteorological Office.

(*c*) To receive reports upon meteorological investigations carried out in the Meteorological Office or on behalf of the Air Ministry and to make recommendations for further action.

(*d*) To co-ordinate the investigations performed in the Meteorological Office with related activities carried out elsewhere, both in this country and abroad.

(*e*) To make an annual report to the Secretary of State for Air.

The Committee consists of a Chairman, four scientist members, the Directors of the Meteorological Office and the Naval Meteorological Service, the Director General of Research, Ministry of Aircraft Production, and representatives of the Air Staff and Ministry of Civil Aviation. The Air Ministry has been fortunate in securing for the Chairman and the scientist members some of the most eminent meteorologists in the country. They include Professor S. Chapman (Chairman), Dr. G. M. B. Dobson, Professor D. Brunt, Sir Charles Normand and Professor Sir Geoffrey Taylor.

The Committee also enjoys the help of outside specialists at Universities and elsewhere, whose advice is obtained in connection with specific problems

During the war the policy adopted by the Committee was to concentrate its attention upon those meteorological problems which are more or less closely concerned with practical questions; and arrangements were made for investigations of a long term or purely scientific character to be handed over to the Royal Society. The task of prosecuting these investigations has been given by the Royal Society to its Gassiot Committee, five of whose members are also members of the Meteorological Research Committee. The members include also Lord Cherwell, Sir Edward Appleton, Sir George Simpson, Sir Harold Spencer Jones, Sir Alfred Egerton and Professor Plaskett.

The importance of this work is recognized in official quarters, and it is pleasing to record that the Air Ministry has recently obtained from the Treasury a grant of £20,000, spread over a period of five years, to assist in the financing of meteorological investigations carried out under the direction of the Gassiot Committee. Generous financial aid is also given by the Royal Society itself.

One of the fundamental long-term investigations undertaken by the Gassiot Committee is the problem of the radiative equilibrium in the atmosphere. This involves investigations into the variability of solar radiation, the composition of the upper atmosphere, and the photo-chemical processes taking place there, the absorption of both ultra-violet and infra-red radiation in the atmosphere, and finally the calculations of the temperature equilibrium. These subsidiary investigations have been entrusted to sub-committees, co-ordination and over-all direction being imparted by the Gassiot Committee itself.

The investigation just described affords an interesting illustration of the type of scientific problem referred to earlier, which can be attempted successfully only by means of "organized" research.

The problems dealt with by the Meteorological Research Committee, on the other hand, are usually of the type from which results may be expected in a relatively short period. Among these may be mentioned the exploration of the lower stratosphere, and the discovery of the exceptionally low humidities occurring there which were described by Dobson, Brewer and Cwilong in the Bakerian Lecture to the Royal Society in 1945. For this investigation it was necessary to develop a special hygrometer which would enable the minute amounts of water vapour present at these low temperatures to be determined with accuracy.

Both these investigations were carried out with the help of the Meteorological Research Flight which forms a vital part of the research organization. The Flight possesses large aircraft which are fitted up as " flying laboratories " and also small aircraft capable of climbing well into the stratosphere. The scientific staff of the Meteorological Research Flight are, of course, meteorologists, whilst the other members are personnel of the Royal Air Force whose keenness and willing co-operation it is a pleasure to acknowledge.

Other problems in which valuable progress has been made include fog prediction, the dynamics and physical structure of cyclones and anti-cyclones, and the determination of vertical currents in cumulo-nimbus clouds. The last of these problems is of great practical importance because of the danger of such currents to aircraft. For this reason it is impracticable to investigate them directly, and their magnitude has to be found by indirect means, such as by calculation from the size of the large hailstones which fall from this type of cloud. Before leaving the cloud these hailstones were supported by the vertical currents, which must therefore have been at least equal to the speed at which the hailstones fall through free air.

The Meteorological Research Committee has devoted considerable attention to the problem of long-period forecasting. Various methods have been tested, but none has proved successful.

A new field of enquiry has been opened in the domain of agricultural meteorology. The nature of the problems involved has been fully discussed with representatives of the Agricultural Research Council, and a programme of investigations is about to commence.

This brief account of the type of problem dealt with by the Meteorological Research Committee would be incomplete without a reference to the very large amount of instrumental development work that has been, and still is being, undertaken. This field includes, in addition to radiosondes, the designing of visibility recorders, instruments for measuring cloud heights in daylight, hygrometers, and many new and improved meteorological instruments for use on aircraft.

In the short space available it is not possible to do more than mention a selection of the investigations on the research programme, but it is hoped that enough has been said to indicate the sort of work that is being done.

Up to the present, the results of the investigations have not been made known as widely as one would have liked, owing to security considerations and the restrictions upon printing which prevailed during the war ; it is hoped that the situation will soon improve, and that many of the wartime reports will shortly be published.

It will have been noted that one of the functions of the Meteorological Research Committee is to co-ordinate the investigations carried out in the Meteorological Office with related activities elsewhere, both in this country and abroad. The Committee has accordingly made a special point of keeping other workers, particularly in the Dominions and Colonies, informed of its work. It has also endeavoured to stimulate meteorological research throughout the Empire, and it is gratifying to find that India and Australia have now their own meteorological research organizations, and that Canada is planning to form one. During the Conference of Empire Meteorologists held in London during March, 1946, the Empire delegates were invited to a special meeting of the Meteorological Research Committee at which problems of mutual interest provided a stimulating discussion. Thus, active collaboration already exists on a wide scale.

In conclusion, it is gratifying to observe that during the last few years there has been a general awakening of the importance of meteorological research. Building on the plans which have already been made, there seem reasonable grounds for hoping that important progress will be made in both the science and the application of meteorology.

METEOROLOGICAL COMMITTEE M.C.-5.

AIR MINISTRY

Report on Work of Meteorological Office during period 1939 - 1947.

The last Annual Report of the Director of the Meteorological Office covered the period 1st April, 1938, to 31st March, 1939. No Reports were issued during the war years.

2. The detailed account of the work of the Meteorological Office during the war is in course of preparation, with a view to its inclusion in the Official History of the War. The section of the "Official History" relating to the work of the Meteorological Office will contain a large amount of information of considerable interest, and will be available to members of the Meteorological Committee, and it is proposed that no further Reports be published in respect of the war period.

3. This leaves the period from the termination of hostilities against Japan to be dealt with. It is proposed that the next Report of the Director of the Meteorological Office should be issued covering the period from the cessation of hostilities until 31st March, 1947. Subsequently, Annual Reports will be issued as before the war.

4. These proposals are submitted for consideration by the Meteorological Committee.

Meteorological Office,
Air Ministry, Kingsway, W.C.2.
September, 1946.

M.C. - 6

METEOROLOGICAL COMMITTEE.

AIR MINISTRY.

INTERNATIONAL MEETINGS. (December 1944 - September 1946)

Meetings of various international bodies have been attended by members of the staff of the Meteorological Office as follows:-

1. International Meteorological Organisation.

(i) Conference of Directors of National Meteorological Services, London, 25th February to 2nd March, 1946, attended by:

The Director.
Mr. E. Gold (President of the Commission for Synoptic Weather Information).

The following members of the staff have been elected as representatives of Great Britain on the Committees and Commissions of the International Meteorological Organisation.

The Director:	President of the International Meteorological Committee.
Mr. E. Gold:	President of the Commission for Synoptic Weather Information.
Commander C.E.N.Frankcom:	President of the Commission for Maritime Meteorology.
Dr. A.H.R. Goldie:	Member of the Commission for Bibliography and Publications and Climatology Commission.
Mr. H.W.L. Absalom:	Member of Commission for Projection of Meteorological Charts and Commission for Aeronautical Meteorology.
Mr. E.G. Bilham:	Member of Commission for Synoptic Weather Information.
Mr. J. Durward:	Member of Commission for Aeronautical Meteorology.
Dr. C.E.P. Brooks:	Member of the Commission for Bibliography, Climatology Commission and Hydrological Commission.
Dr. J.M. Stagg:	Member of Commission for Instruments and Methods of Observation.
Dr. F.J. Scrase:	Member of Commission for Instruments and Methods of Observation.
Mr. C.K.M. Douglas:	Member of Commission for Instruments and Methods of Observation.
Mr. C.S. Durst:	Member of Commission for Agricultural Meteorology.
Mr. S.P. Peters:	Member of Commission for Synoptic Weather Information.
Dr. J. Glasspoole:	Member of Hydrological Commission.
Group Captain R.C. Sutcliffe:	Member of the Aerological Commission.
Mr. C.H.B. Priestley:	Member of the Aerological Commission.

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(ii) Regional Commission VI. (Europe), held in Paris, 10th to 14th June, 1946, attended by:-

The Director

(iii) Commission for Aeronautical Meteorology, held in Paris, 14th to 18th June, 1946, attended by:-

Mr. E. Gold (President of the Commission for Synoptic Weather Information)
Mr. H.W.L. Absalom
Mr. J. Durward

(iv) Commission for Synoptic Weather Information, held in Paris, 18th to 29th June, 1946, attended by:-

Mr. E. Gold (President)
Mr. E.G. Bilham
Mr. S.P. Peters
Commander C.E.N. Frankcom (President of Commission for Maritime Meteorology)

(v) International Meteorological Committee, held in Paris, 1st to 10th July, 1946, attended by:-

The Director (President)
Mr. E. Gold (President of Commission for Synoptic Weather Information)
Commander C.E.N. Frankcom (President of Commission for Maritime Meteorology)
Group Captain C.W.G. Daking (Air Division, Allied Control Commission, Berlin)

(vi) Executive Council, held in Paris, 11th July, 1946, attended by:-

The Director (President)

2. Provisional International Civil Aviation Organisation

(i) International Civil Aviation Conference, held in Chicago, November to December, 1944, attended by:-

Mr. C.W.G. Daking

(ii) First Session of the Meteorological Committee, held in Montreal, 5th October to 13th November, 1945, attended by:-

Mr. F. Entwistle
Mr. C.W.G. Daking

(iii) North Atlantic Route Service Conference, held in Dublin, 4th to 27th March, 1946, attended by:-

Mr. J. Durward
Mr. S.P. Peters
Mr. A.L. Maidens

(iv) European and Mediterranean Regional Air Navigation Conference, held in Paris, 25th April to 14th May, 1946, attended by:-

Mr. S.P. Peters
Group Captain C.W.G. Daking
Wing Commander E. Chambers
Wing Commander R. Farms
Wing Commander G.J.W. Oddie

/(v)

(v) Caribbean Regional Air Navigation Conference, held in Washington, commencing 26th August, 1946, attended by:-

Mr. J. Durward
Squadron Leader S.E. Virgo

(vi) North Atlantic Meteorological Ships Conference, held in London, commencing 17th September, 1946, attended by:-

The Director
Mr. E. Gold (representing the International Meteorological Organisation)
Commander C.E.N. Frankcom
and other members of the Staff as required.

3. International Union of Geodesy and Geophysics

Extraordinary Assembly, held in Cambridge, 29th July to 2nd August, 1946, attended by:-

Dr. A.H.R. Goldie
Dr. J.M. Stagg (General Secretary)

4. British Commonwealth Scientific Official Conference, held in London, July 1946, attended by:-

Dr. A.H.R. Goldie

6. Conference of Empire Meteorologists, held in London 4th to 9th March, 1946, attended by:-

The Director
Mr. E. Gold
Mr. R. Corless
Dr. A.H.R. Goldie
Mr. H.W.L. Absalom
Mr. E.G. Bilham
Mr. J. Durward
and other members of the Staff as required.

Meteorological Office,
Air Ministry, London, W.C.2.
September, 1946

N.K. JOHNSON
Director

G.128524

METEOROLOGICAL COMMITTEE

AIR MINISTRY

Membership in 1939 and 1946

Department or Society	Representation	
	1939	1946
Under Secretary of State for Air (Chairman)	Capt. H.H. Balfour, M.P.	Mr. Geoffrey de Freitas, M.P.
Royal Society	Prof. S. Chapman Sir Henry Lyons	Prof. S. Chapman Dr. G.M.B. Dobson
Royal Society of Edinburgh	Sir D'Arcy Thompson	Sir D'Arcy Thompson
Admiralty (The Hydrographer)	Admiral Sir John Edgell	Vice Admiral A.G.N. Wyatt
War Office	Col. P.J.R. Montague (Supt. of Experiments Shoeburyness)	Major General C.G.G. Nicholson (Director of Artillery)
Ministry of Agriculture and Fisheries	Sir Thomas Middleton	Sir Edward Salisbury
Colonial Office	Mr. W.J. Bigg	Mr. W.J. Bigg
Scottish Office	Mr. P.J. Rose	Mr. J.J.W. Handford
Ministry of Supply	-	Sir Ben Lockspeiser
Ministry of Civil Aviation	-	Mr. W.E.B. Griffiths
Ministry of Transport (previously Board of Trade)	Captain T.P. Marshall	Captain J.H. Quick
Air Ministry	Mr. W.G. Nott Bower (P.E.O.) Mr. W.G. Clements (F.3)	Mr. W.B. Foden (P.E.O.) Mr. R.C. Chilver (A.U.S.(G))
Director Meteorological Office	Dr. N.K. Johnson	Sir Nelson Johnson

MINUTES

METEOROLOGICAL COMMITTEE.

One Hundred and Sixty-Second Meeting,
held in the Air Council Room, Whitehall,
at 11 a.m. on 30th October, 1947.

PRESENT:-

Mr. Geoffrey de Freitas, M.P.,
The Under Secretary of State for Air. (In the Chair)

Professor S. Chapman (Royal Society)
Professor G.M.B. Dobson (Royal Society)
Mr. W.J. Bigg (Colonial Office)
Captain J.H. Quick (Ministry of Transport)
Mr. W.B. Foden (Air Ministry)
Mr. R.C. Chilver (Air Ministry)
Sir Nelson Johnson (Director, Meteorological Office)
Mr. R.J. Williams (Secretary)

Captain J.W. Josselyn (Director of Naval Meteorological Service) representing the Hydrographer, Admiralty; Colonel B.P. Hughes, representing the Director of Artillery, (War Office); Mr. W. Lewis, representing Mr. J.J.W. Handford (Scottish Office); and Mr. E. Gold (Deputy Director, Meteorological Office) also attended.

Apologies for absence were received from the following:-

Professor Sir D'Arcy Thompson (Royal Society of Edinburgh)
Sir Edward Salisbury (Ministry of Agriculture and Fisheries)
Sir Ben Lockspeiser (Ministry of Supply).

1393 The Minutes of the 161st meeting held on 3rd October, 1946, were considered and, after discussion, were confirmed and signed.

1394 Arising out of Minute 1386.

It was reported that the proposal for a centrally controlled meteorological service for the Colonies had been discussed at the Colonial Civil Aviation Conference held in London in April, 1947. Representatives from most of the Colonies considered that there were difficulties and objections to the scheme. For political and other reasons certain territories such as Ceylon, Fiji, Central Africa and Palestine would in any event have to be excluded from such a service. It was finally decided not to proceed with the proposal to form a single centrally controlled meteorological service, and it was recommended that the Colonial meteorological service should be organised as far as possible on a regional basis. In some areas it might be desired that the services should be organised and controlled by the Air Ministry on terms to be agreed, whilst in others the Colonial Governments concerned would retain the responsibility for the provision of the services required. In the former case, the Meteorological Office would continue the direct provision of meteorological services, and in the latter, the Meteorological Office would be prepared to give such advice and assistance as might be required by the Colonial Governments concerned. The present position is that West Africa, East Africa, Malaya, Bermuda and Ceylon are resuming control of their own services, though receiving assistance from the Meteorological Office during the transitional period. The meteorological service in the West Indies organised by the Meteorological Office during the war will continue to be attached to the Meteorological Office. The meteorological service in the Falkland Islands will also be provided by the Meteorological Office.

Mr. Bigg confirmed that the Colonial Office received adequate assistance and advice from the Meteorological Office in connection with the provision of meteorological services in the Colonies.

The Director emphasised that the Meteorological Office is willing to do everything possible to help Colonial meteorological services during the period of reorganisation.

Captain Josselyn stated that he had heard that the Meteorological Service in Bermuda was to be transferred completely to the United States, and he stressed the importance of the service to the Navy. Mr. Bigg stated that the matter was still under discussion, and that the Colonial Office would keep in close touch with the Admiralty on future developments.

1395 Arising from Minute 1388.

Mr. Foden reported that the Sub-Committee to recommend higher appointments in the Meteorological Office had not yet met, since a final decision upon the top structure of the Meteorological Office had been delayed. Approval had, however, now been obtained for a post of Principal Deputy Director and three Deputy Directors, and since all these posts required to be filled (allowing for the imminent retirement of the existing Deputy Director), the Secretary of State had felt that the occasion was particularly exceptional, and that it was desirable to advertise publicly the vacancies for the Principal Deputy Director and one Deputy Director. This meant bringing in a Civil Service Commission representative, and the sub-Committee would accordingly be strengthened on this occasion.

1396 Constitution and Terms of Reference of the Meteorological Committee.

The Chairman drew the attention of the Committee to the memorandum prepared by the Air Ministry (M.C.-8) setting out a revised constitution and terms of reference of the Meteorological Committee. The functions approved in 1920 had visualised the Meteorological Committee as an executive committee running the Meteorological Office. The functions had now changed, and the Committee was now essentially an advisory body.

After discussion, the Committee agreed to the Revised Constitution and Terms of Reference of the Meteorological Committee, a copy of which is attached as an appendix to the Minutes.

1397 Annual Report of the Director.

The Chairman asked the Committee to consider the Annual Report of the Director for the period August 1945 to 31st March, 1947. (M.C.-9). (See footnote.)

Professor Chapman suggested that the composition of the Meteorological Research Committee should be included with the other Committees at the beginning of the report and not in the text.

Captain Josselyn referred to the discussion recorded in Minute 1389 regarding the inclusion of an account of the work of the Naval Meteorological Service in the report. He stated that the Board of Admiralty had considered the matter and Their Lordships had decided that the Director of the Naval Meteorological Service should prepare an annual report, and that a copy should be sent to the Meteorological Committee for their information. It was not intended that it should be incorporated into the annual report on the work of the Meteorological Office nor that it should be attached as an appendix thereto.

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Footnote. It was subsequently found that the Annual Report had already been printed. The amendments proposed below are therefore not embodied in the Report as issued.

The Secretary reported that a copy of the report on the Naval Meteorological Service for the period 1st July 1945 to 31st March 1947 had been received, and was now in process of circulation to members of the Committee.

It was suggested that a paragraph might be inserted in document M.C.-9, giving a brief summary of the work of the Naval Meteorological Service during the period under review.

Mr. Bigg commented upon the various references in the report to the meteorological services provided in the Colonies, and suggested that the references to Palestine should be included in the section "Services for the Colonies, etc." instead of in the section "Services in foreign countries".

The Director referred to the report on the work of the Meteorological Office during the war, and stated that the report is nearing completion. It will consist of four or five volumes, and will provide a detailed record of the work of the Office in all its aspects, including the supply of meteorological facilities for the Fighting Services, Government Departments and Essential Services, and the technical and administrative organisation involved.

The Committee accepted the Annual Report of the Director for the period August, 1945, to 31st March, 1947, subject to the following amendments:-

(1) The word "annual" to be omitted from the title.
(2) The list of members of the Meteorological Research Committee to be included with other Committees at the beginning of the Report.
(3) Page 10. - Omit references to future supply of radio sonde and radio wind installations in so far as they refer to the Colonies in Africa and the Far East and transfer them to page 18.
(4) Page 18. - Services for civil aviation in the Colonies to be transposed to page 15 under "Services for Civil Aviation".
(5) Page 20. - Transpose reference to Palestine to Page 17.
(6) Page 20. - Third line from bottom, "Shuaiba" to read "Shaiba".
(7) Pages 40-41. - References to P.I.C.A.O. to read I.A.C.O.
(8) Page 45. - "Aldegrove" to read "Aldergrove".

1398 Reorganisation of the Meteorological Office.

As the Director had only just returned from meetings of the International Meteorological Organisation in North America, the Chairman asked Mr. Foden to summarise the latest position regarding the reorganisation of the Meteorological Office.

Mr. Foden stated that since the last meeting of the Committee, discussions had taken place regarding the proposed framework of posts but the Department's proposals had not yet been finalised. The Treasury had so far approved four deputy director posts and nine Senior Principal Scientific Officer posts but the appointments to these posts had not yet been made (see Minute 1395).

As regards the outstation organisation of the Office, a scheme for organising the forecasting services at home on a regional basis had been under consideration. The scheme involved substantial changes in the network of communications and was linked with the division of the country into Air Traffic Control Areas. Under this scheme, regional forecast centres would be established at Air Traffic Control Centres and the scientific officer class engaged on forecasting for aviation would be mainly concentrated at these centres, although a few would also be employed at the main civil airports (e.g. London Airport and Prestwick). Under this scheme, forecasting units at R.A.F. Groups and stations, and at civil airports generally, would work under guidance from one of the regional centres and would be staffed with experimental officers.

This scheme was still under consideration. In the meantime, the outstation organisation would continue on a functional basis.

The Committee noted the present position of the reorganisation of the Meteorological Office.

1399 Allocation of Meteorological Office Staff between User Departments.

The Chairman drew the attention of the Committee to the Memorandum on the allocation of manpower in the Meteorological Office (M.C.-10).

The Director explained that the commitments of the Meteorological Office during the next year or so are likely to be greater than can be met from the available personnel. It therefore became necessary to decide how to allocate the available manpower between different users. The allocation suggested in the memorandum proceeded on the basis that the Central Forecasting Office and the principal Air Traffic Centres at home and overseas should be fully manned, since upon these the operational efficiency of the meteorological service depends. These were therefore given 100% allocation, meteorological research was given 90% and the remaining requirements, i.e., Headquarters (administrative and technical) and outstations in general, were given an allocation of between 70% and 75%. There were certain "diminishing requirements" in former theatres of war, in colonial areas and in certain countries to which meteorological assistance was being given. The rate of reduction of these "diminishing requirements" would probably balance approximately the rate of release of the meteorologists who were still serving in the R.A.F. and W.A.A.F.

Captain Josselyn stressed the importance of providing the maximum staff possible for research. It was agreed that the 90% allocation to research should be raised to 100% as soon as further staff became available.

The Director stressed the temporary character of the situation, which, it was hoped, would improve in about a year's time.

The Chairman asked whether the Committee agreed to the proposed allocation of available manpower. After some discussion, during which the requirements of the R.A.F., War Office and Civil Aviation (at home and abroad) were considered, the Committee agreed to the proposals contained in the memorandum.

1400 Meteorological Research - Report of the Meteorological Research Committee.

The Chairman referred to the Report of the Meteorological Research Committee for the year ended 31st March, 1947 (M.C.-11), which had been previously submitted to the Secretary of State for Air.

The Director drew the attention of the Committee to the work being done in connection with agricultural meteorology.

The Committee noted the Report of the Meteorological Research Committee.

1401 International Meetings.

The Chairman drew the attention of the Committee to the large contribution which the Meteorological Office and its Director have made and are making in the field of international meteorology.

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The Director gave a brief account of the activities of the International Meteorological Organisation since the end of the war and mentioned the various meetings of the Conference of Directors, the International Meteorological Committee, the Executive Council and Technical and Regional Commissions which had taken place during 1946 and 1947 in London, Paris, Toronto and Washington. He also mentioned the various regional air navigation meetings of the International Civil Aviation Organisation.

The Chairman asked what arrangements were being made for the International Meteorological Organisation to be affiliated to the United Nations.

The Director stated that the Conference of Directors in Washington had prepared and agreed upon an international Convention which changed the status of the I.M.O. to that of an inter-governmental organisation. This Convention had been signed by 33 states at the end of the Washington meeting. The Conference also unanimously approved the principle of affiliating the World Meteorological Organisation to the United Nations as a specialised agency, and appointed a sub-committee to prepare a draft agreement in consultation with representatives of the United Nations. The draft agreement had not been completed in time to submit it to the Conference, but it was now being distributed to the directors of meteorological services for their approval.

Mr. Bigg asked about the status of the Colonial Meteorological Services in the new Convention. The Director stated that the new Convention provided for equality between Colonial meteorological services which were already members of the International Meteorological Organisation, and other sovereign states in all matters except those of a diplomatic character.

The Chairman asked Mr. Chilver, who had also attended the Conference, to give a brief account of the discussions on the new World Meteorological Convention. Mr. Chilver explained that the present Organisation is merely an association of directors of meteorological services, and that it had been felt for some time that it ought to be replaced by an inter-governmental organisation. It became clear at the beginning of the Conference that opinion about the desirability of an inter-governmental convention was divided. Several delegates spoke strongly in favour of leaving matters as they were, and others, whilst not in principle against a convention, were only prepared to agree to it if the principles which governed the International Meteorological Organisation were maintained. The misgivings arose from the fact that an increasing tendency had been noticed recently for meteorologists attending international conferences to speak and vote as representatives of particular countries instead of dealing with issues from the scientific point of view; and that in the International Meteorological Organisation all directors of meteorological services were eligible for membership on a basis of equality regardless of the political status of the country to which they belonged. After discussion it was decided that proposals for a convention should proceed, but that they must provide for equality between meteorological services, at least in the technical field, in spite of some anomalies to which that gave rise, and for preserving as far as possible the world-wide character of the Organisation. The questions of voting and membership gave rise to much discussion, but in the end agreement was reached on a convention which was signed by most of the Directors present. This was a reasonably workmanlike document, and the organisation it is designed to establish ought to work satisfactorily. It remained to see whether it would be ratified by the requisite number of states. If it was not ratified by any major country - and the attitude of the U.S.S.R. was impossible to predict - the new organisation could hardly be brought into being. In the meanwhile, of course, the present organisation would continue to function.

Mr. Gold mentioned the large amount of work which had been put into the production of the new synoptic codes and specifications, which had been approved by the International Meteorological Committee in Paris last year and amended by the recent Conference of Directors in Washington.

The Committee noted the international activities of the Office.

/ 1402.

1402 Date of Next Meeting.

The Chairman suggested that the date of the next meeting of the Committee should be left open, but as the revised Constitution called for meetings to be held not less often than once in six months, a meeting of the Committee would probably be held before next April.

1403 Other Business.

The Chairman informed the Committee that Mr. Gold would be retiring from the service of the Meteorological Office to-morrow, the 31st October, and gave a brief account of the work Mr. Gold had done in the Meteorological Office.

The Chairman conveyed to Mr. Gold the best wishes of the Committee in his retirement.

1404 The Committee rose at 12.30 p.m.

Meteorological Office,
Air Ministry,
London, W.C.2.

MINUTES OF 162nd MEETING OF THE METEOROLOGICAL COMMITTEE

APPENDIX

CONSTITUTION AND FUNCTIONS OF THE METEOROLOGICAL COMMITTEE.

The Meteorological Committee shall be constituted as follows:-

The Under-Secretary of State for Air (Chairman)
The Director of the Meteorological Office (ex officio)
2 representatives nominated by the Royal Society
1 representative " " " Royal Society of Edinburgh
1 " " " " British Universities
2 representatives " " " Air Ministry
1 representative " " " Admiralty
1 " " " " War Office
1 " " " " Ministry of Agriculture & Fisheries
1 " " " " Ministry of Civil Aviation
1 " " " " Colonial Office
1 " " " " Scottish Office
1 " " " " Ministry of Supply
1 " " " " Ministry of Transport
1 " " " " Ministry of Fuel and Power
(A Secretary shall be appointed by the Chairman).

2. The Committee shall :-

(a) Advise the Secretary of State for Air on matters referred to it concerning the State meteorological service.

(b) Make recommendations to the Secretary of State for Air for appointments in the Meteorological Office of the grade of Deputy Director and above.

(c) Report annually to the Gassiot Committee of the Royal Society on the use made of the income from the Gassiot Trust for magnetic and meteorological observations or other physical investigations in accordance with the terms of the Trust.

(d) Submit to the Secretary of State for Air an Annual Report on the work of the Committee.

3. In the absence of the Chairman, the chair shall be taken by a Vice-Chairman, elected for the ensuing year by the Committee from among the representatives of the Royal Society and the Royal Society of Edinburgh.

4. The members of the Committee shall be appointed by the Secretary of State for Air and, subject to the discretion of the authorities by which they are nominated, will retain their membership for not more than five years; but they may be reappointed.

5. The members of the Committee will not be paid for their services, but travelling and subsistence expenses will be allowed to members who do not live in London.

6. The Chairman shall call meetings when there is business to be transacted, and in any case not less often than once in six months. The agenda and any papers to be considered shall be distributed at least a fortnight beforehand.

M.C.-8.

METEOROLOGICAL COMMITTEE.

AIR MINISTRY.

CONSTITUTION AND TERMS OF REFERENCE OF THE METEOROLOGICAL COMMITTEE.

Note by the Air Ministry.

The constitution and terms of reference of the Meteorological Committee, drawn up in 1920, are attached as Appendix A. to this paper. They are now newhat out of date, and at Appendix B. is a revised draft which is recommended the consideration of the Committee.

The functions of the Committee as described in Appendix A. visualised t would in effect be an executive committee running the Meteorological Office. Meteorological Office has since, however, grown into an important and egral part of the Government machine, and cannot well be administered by a mittee. The present function of the Meteorological Committee is essentially isory: it exists to give the departments that use the services of the eorological Office, and the scientific interests concerned, an opportunity of iewing the Office's work and making proposals for improving or extending it. revised terms of reference now circulated are drafted accordingly.

A minor point arises with regard to the appointment of staff. With reorganisation of the Meteorological Office, as described at the last meeting the Committee, it seems appropriate for the Committee to recommend appointments the grade of Deputy Director and above instead of "Assistant Directors and erintendents".

The list of departments represented has been brought up to date by ing the Scottish Office and the Ministries of Civil Aviation, Supply, and Fuel Power, and substituting the Ministry of Transport for the Board of Trade. is also suggested that a representative of the British Universities should be ed to the Committee, because meteorology is taught at certain universities.

il, 1947.

APPENDIX 'A'.

Constitution and Functions of the Meteorological Committee.

The Meteorological Committee shall be constituted as follows :-

1 The Controller-General of Civil Aviation (Chairman).
1 Director of the Meteorological Office (ex officio).
2 Representatives nominated by the Air Ministry (including one for Finance).
1 The Hydrographer of the Navy, representing the Admiralty.
1 Representative nominated by the War Office.
1 " " " " Ministry of Agriculture & Fisheries.
1 " " " " Board of Trade.
1 " " " " Colonial Office.
2 " " " " Royal Society.
1 " " " " Royal Society of Edinburgh.

(A Secretary shall be appointed by the Chairman).

2. The Director of the Meteorological Office shall be appointed by the Air Council.

3. The Controller-General of Civil Aviation shall act as Chairman of the Committee, and shall be responsible as a member of the Air Council for reporting to that Council. In his absence a Vice-Chairman, elected for the ensuing year by the Committee and selected from among the representatives of the Royal Society and the Royal Society of Edinburgh at the last ordinary meeting in each year, shall take the Chair.

4. The members of the Committee shall be appointed by the Air Council, and, subject to the discretion of the Authorities by which they are respectively nominated, will hold office for a period not exceeding five years; but will be eligible for re-appointment.

5. The members of the Committee will not receive remuneration for their services, but travelling and subsistence expenses will be allowed in the case of members not residing in the Metropolis.

6. The Chairman shall call six ordinary meetings each year, and such extraordinary meetings as he shall consider necessary. The dates of the ordinary meetings in each year shall be approved at the last ordinary meeting of the preceding year. The notice of any extraordinary meetings, together with the Agenda to be transacted at such meeting, shall be circulated not less than a week before the date of the meeting.

7. The Committee shall :-

(i) Receive the Annual Report prepared by the Director and, if approved, transmit it to the Air Council.

(ii) Consider and, if approved, transmit to the Air Council the financial programme in connection with the estimates for the coming year, and decide upon any important modifications of the programme which may be found desirable during the course of the year.

(iii) Review the scientific and observational activity of the Office, and consider such proposals as may be submitted to them by the Director for experimental work, the establishment of observatories or stations, and the allocation of staff to be employed.

(iv) Delegate, by special instructions to be recorded in the minutes, such functions as they may think fit to the Director of the Meteorological Office, or to any Sub-Committee appointed for a special purpose.

/ (v) .....

(v) Appoint Assistant Directors and Superintendents, after consideration of the recommendations of the Director.

(vi) Submit annually to the Committee, appointed by the Council of the Royal Society under the Gassiot Trust, proposals respecting the allocation of the income from the Trust for magnetic and meteorological observations or other physical investigations in accordance with the Trust.

8. The Director of the Meteorological Office will act generally as adviser to the Committee on all meteorological and geophysical subjects, and shall be responsible for :-

(i) The administration of the Office and the execution of the duties delegated to him by the Committee.

(ii) The appointment of all members of his staff, other than those referred to in 7(v) above.

(iii) The issue of all meteorological publications authorised by the Committee.

(iv) Bringing before the Meteorological Committee for their consideration, all matters of importance relating to the application, progress and development of the Science of Meteorology in which the Meteorological Service might share.

(v) Referring to the Finance Department of the Air Ministry proposals for expenditure to be incurred by the Office before submission to the Committee.

M.C.-8.

APPENDIX 'B'.

CONSTITUTION AND FUNCTIONS OF THE METEOROLOGICAL COMMITTEE.

The Meteorological Committee shall be constituted as follows :-

The Under-Secretary of State for Air (Chairman)
The Director of the Meteorological Office (ex officio)
2 representatives nominated by the Royal Society
1 representative " " " Royal Society of Edinburgh
1 " " " " British Universities
2 representatives " " " Air Ministry
1 representative " " " Admiralty.
1 " " " " War Office
1 " " " " Ministry of Agriculture & Fisheries
1 " " " " Ministry of Civil Aviation
1 " " " " Colonial Office
1 " " " " Scottish Office
1 " " " " Ministry of Supply
1 " " " " Ministry of Transport
1 " " " " Ministry of Fuel and Power
(A Secretary shall be appointed by the Chairman).

2. The Committee shall :-

(a) Advise the Secretary of State for Air on matters referred to it concerning the State meteorological service.

(b) Make recommendations to the Secretary of State for Air for appointments in the Meteorological Office of the grade of Deputy Director and above.

(c) Report annually to the Gassiot Committee of the Royal Society on the use made of the income from the Gassiot Trust for magnetic and meteorological observations or other physical investigations in accordance with the terms of the Trust.

(d) Submit to the Secretary of State for Air an Annual Report on the work of the Committee.

3. In the absence of the Chairman, the chair shall be taken by a Vice-Chairman, elected for the ensuing year by the Committee from among the representatives of the Royal Society and the Royal Society of Edinburgh.

4. The members of the Committee shall be appointed by the Secretary of State for Air and, subject to the discretion of the authorities by which they are nominated, will retain their membership for not more than five years; but they may be reappointed.

5. The members of the Committee will not be paid for their services, but travelling and subsistence expenses will be allowed to members who do not live in London.

6. The Chairman shall call meetings when there is business to be transacted, and in any case not less often than once in six months. The agenda and any papers to be considered shall be distributed at least a fortnight beforehand.

M.C. - 9

METEOROLOGICAL COMMITTEE

Annual Report
of the Director of the
Meteorological Office
presented by the Meteorological Committee
to the Secretary of State of Air
for the period
August 1945, to March 31st 1947.

The Annual Report which was previously circulated in proof stage was accepted, subject to amendments, by the Committee - see Minute 1397.

AIR MINISTRY

ALLOCATION OF MANPOWER IN THE METEOROLOGICAL OFFICE

The commitments of the Meteorological Office during the next year or two are likely to be greater than can be met from the available personnel. It therefore becomes necessary to decide how to allocate the available manpower between the different users.

2. Personnel available.

Treasury approval has so far been obtained for the following numbers to cover "permanent requirements" :-

173 Scientific Officers (+ 4 over the age of 60)
562 Experimental Officers
1016 Assistants
261 Locally Entered Assistants

The number of Experimental Officers was based on the assumption that 28 posts at Headquarters now held by these grades would in future be filled by clerical grades. It is now understood that the 28 Clerical Officers in question cannot immediately be supplied. In addition, we are authorised to employ an undefined temporary fringe to cover "diminishing requirements".

In practice (owing to the insufficiency of scientific personnel in the country as a whole) it will probably prove impossible to fill the approved posts in the scientific class before 1950 at the earliest. In the experimental class the position is unlikely to be much better. At the end of 1947 the numbers of established officers are unlikely to exceed 155 in the S.O. class and 550 in the E.O. class.

As to assistants, we hope to have not less than 1100, and are aiming at 1300 by the end of this year, by which time the number of airmen meteorologists will have been reduced to about 235.

3. Permanent Requirements.

The permanent requirements and a suggested allocation to them of established staff are set out in Table I. The principles on which the allocations have been made are as follows :-

(i) No reduction from establishment is made for staff at the Central Forecasting Office and at Air Traffic Centres at home and abroad. It is only in this way that the standards of forecasting throughout the Meteorological Office can be kept at the highest possible level. A fundamental analysis of all synoptic charts, data from which upper air contours can be plotted directly and data from which charts can be constructed giving a forecast of the anticipated pressure distribution and movement of fronts, are broadcast from the Central Forecasting Office and form a basis for the work at subsidiary forecasting units.

(ii) Miscellaneous users are also allocated 100% of staff. In every case the meteorological unit is so small that any reduction in staff would result in the abolition of the unit or its reduction to virtual ineffectiveness.

(iii) In the case of Radio-sonde stations and Ocean Weather Ships, any reduction of staff would entail a corresponding reduction in the programme of observations. Upper air data from the Oceans and from Continents are, with the full programme in operation, more scanty rather than more plentiful than could be desired for forecasting purposes and for the determination of upper winds for aircraft. It is recommended, therefore, that no reduction of staff should be made on Ocean Weather Ships and for Radio-sonde stations.

(iv) An allocation of 90% of staff requirements is proposed for research. The Report of the Meteorological Research Committee to the Secretary of State for Air for the year ended 31st March, 1947, contains the statement that the past year has been disappointing from the point of view of the number of staff which it has been possible to employ upon research work. The same report contains the statement that the shortage of staff has seriously curtailed fundamental research on problems of forecasting. The Committee has prepared a revised programme of investigations for the forth-coming year in which it has been found necessary to reduce the number of priority problems. It is necessary to have as big a number of staff as possible devoting their time to these investigations if any appreciable headway is to be made within a reasonable period. Hence the proposed allocation of 90% of staff required to cover the whole field of research.

4. Diminishing Requirements.

The current but diminishing requirements cover meteorological services or liaison officers being maintained in Germany, Austria, Japan, India and the Italian Colonies; assistance still being given to the Colonial Governments in West Africa, East Africa, Ceylon, Malaya, Hong Kong and Burma, assistance being given in Portugal, Italy, the Sudan and Greece; and the maintenance of certain radio sonde stations - Habbaniya, Benghazi, Nairobi, Aqir and stations in Germany. At the present time these requirements total 13 of the S.O. class, 82 of the E.O. class, 159 assistants, 23 mechanics and 110 locally entered meteorological assistants (L.E.M.As).

The temporary fringe of staff includes at present in officer grades 174 unestablished civilian staff of S.O. and E.O. categories combined, and 116 mobilised R.A.F. and W.A.A.F. officers. The number of mobilised officers without civilian appointments awaiting them is approximately 65, of which only 10 may be expected to take temporary appointments or postpone release beyond the year. Resignations are occurring among established as well as temporary staff, and the estimated loss on this account within the year is 60, making a total loss of about 115 in officer grades within the year.

5. Balance Sheet.

Table II is the resulting balance sheet of staff available at September, 1947, and estimated to be available at September, 1948, against the minimum numbers required to meet the allocations suggested in Table I.

It will be seen that, on the basis of allocations which, for many of the requirements, go as low as 70%, we pass from a nominal excess of 51 in September, 1947, to an estimated deficiency of 36 in September, 1948. In practice, the initial position is somewhat worse than these figures suggest, owing to the number of officers who at the present time are engaged in travelling to or from foreign stations or on foreign service leave or release leave or undergoing training.

Meteorological Office,
Air Ministry, London, W.C.2.
October, 1947.

TABLE 1.

Suggested Allocation of Available Staff.

	S.O. Class			E.O. Class			Assistant Class			L.E.M.A. Class		
	Reqd.	Proposed Allocation Nos.	%	Reqd.	Proposed Allocation Nos.	%	Reqd.	Proposed Allocation Nos.	%	Reqd.	Proposed Allocation Nos.	%
H.Q. Administration	25	18	73 (a)	13	10	80	14	11	80			
" Technical	39	28	73 (a)	53	42	80	101	80	80			
" Additional if clericalisation fails to materialise	-	-	-	28	21	80	-	-	-			
C.F.O. Routine	15	15	100	23	23	100	83	83	100			
Air Traffic Control Centres and R.A.F. Home	50	46	100-73 (b)	270	213	100-68 (b)	559	467	100-80 (b)			
R.A.F. Overseas	13	11	100-70 (b)	65	55	100-70 (b)	56	47	100-70 (b)	132	132	100
C.A. Home	13	10	75	145	109	76	334	(237)	(71)			
" Overseas	9	7	75	26	20	76	-	-	-			
War Office and Ministry of Supply	7	5	75	9	7	75	30	(21)	(71)			
Research	14	13	90	16	14	90	28	(25)	90	8	8	100
Miscellaneous (Merchant Navy, Agric.)	2	2	100	8	8	100	6	6	100			
Special - (Weather Ships	-	-	-	12	12	100	16	16	100			
Radio, Sonde)	-	-	-	16	16	100	122	(117)	96	22	22	100
Total of proposed numbers	187	155	-	684	550	-	1349	1110	-	162	162	-

Notes. Figures in brackets represent minima.

(a) In practice, this means that the directing posts would be filled completely, and the other posts would receive a 70% allocation.

(b) The first figure, 100%, relates to forecast centres, the lower percentage is the number available for other stations.

TABLE II.

Staff Position, 1947-48.

Officer Grades (S.O. class and E.O. class)

	Sept. 1947	Sept. 1948 (Estimated)
Staff available.		
Established civilian officer staff	576	546
Unestablished civilian officer staff	174	144
R.A.F. and W.A.A.F.	116	61 *
TOTAL	866	751
Proposed Distribution of Staff.		
Minimum allocation to permanent posts as in Table I	705	705
Number absorbed in travel, foreign service leave, etc., (say)	15	15
"Diminishing requirements"	95	67
	815	787
Nominal Excess (or Deficiency) over minimum allocations of Table I.	+ 51	- 36

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* The officers in question will mostly be out of uniform by that time.

M.C. - 11

METEOROLOGICAL COMMITTEE

Report of the Meteorological Research Committee
to the
Secretary of State for Air
for the year ended 31st March, 1947.

The Report of the Meteorological Research Committee (M.R.P. 335) which was previously circulated was noted by the Committee - see Minute 1400.

METEOROLOGICAL COMMITTEE.

AIR MINISTRY.

INTERNATIONAL MEETINGS. (October 1946 to October 1947).

Meetings of various international bodies have been attended by members of the staff of the Meteorological Office as follows:-

1. INTERNATIONAL METEOROLOGICAL ORGANISATION.

(i) Regional Commission VI (Europe), held in Paris, 20th to 24th January, 1947, attended by:-

The Director
Mr. E.G. Bilham

(ii) Regional Commission V (South West Pacific), held in Melbourne, 21st to 30th January, 1947, attended by:-

Mr. J. Durward.

(iii) Telecommunications Sub-Committee for Western Europe of Regional Commission VI (Europe), held in Utrecht, 25th to 28th March, 1947 and Paris, 28th to 30th April, 1947, attended by:-

Mr. C.V. Ockenden.

(iv) Regional Commission I (Africa), held in Salisbury, Southern Rhodesia, 22nd April to 1st May, 1947, attended by:-

Mr. S.P. Peters
Mr. R.G. Veryard.

(v) Executive Council, held in Lausanne, 12th to 14th June, 1947, attended by:-

The Director (President).

(vi) Climatological Commission, held in Toronto, 4th to 26th August, 1947, attended by:-

Dr. C.E.P. Brooks.

(vii) Aerological Commission, held in Toronto, 4th to 16th August, 1947, attended by:-

Dr. R.C. Sutcliffe
Professor P.A. Sheppard (as Meteorological Office representative)

(viii) Commission for Instruments and Methods of Observation, held in Toronto, 4th to 16th August, 1947, attended by:-

Dr. F.J. Scrase.

(ix) Hydrological Commission, held in Toronto, 4th to 16th August, 1947, attended by:-

Dr. C.E.P. Brooks.

(x) Commission for Agricultural Meteorology, held in Toronto, 11th to 23rd August, 1947, attended by:-

Dr. C.E.P. Brooks.

(xi) Commission for Maritime Meteorology, held in Toronto, 11th August, to 30th August, 1947, attended by:-

Commander C.E.N. Frankcom (President).

(xii) Commission for Aeronautical Meteorology, held in Toronto, 18th to 30th August, 1947, attended by:-

Mr. J. Durward.

(xiii) Commission for Projection of Meteorological Charts, held in Toronto, 27th to 30th August, 1947, attended by:-

Mr. J. Durward.

(xiv) Commission for Synoptic Weather Information, held in Toronto, 25th August, to 13th September, 1947, attended by:-

Mr. E. Gold (President)
Mr. E. G. Bilham.

(xv) Commission for Bibliography and Publications, held in Toronto, 1st to 6th September, 1947, attended by:-

Dr. C. E. P. Brooks.

(xvi) Regional Commissions III & IV (North and South America) - Joint Meeting, held in Toronto, 8th to 13th September, 1947. attended by:-

Mr. J. Durward.

(xvii) Conference of Directors of National Meteorological Services, held in Washington, 22nd September to 7th October, 1947, attended by:-

The Director (President)
Mr. E. Gold (President of Commission for Synoptic Weather Information)
Commander C. E. N. Frankcom (President of Commission for Maritime Meteorology)

2. INTERNATIONAL CIVIL AVIATION ORGANISATION

(i) Second session of the Meteorological Division, held in Montreal, 29th October to 16th November, 1946, attended by:-

Mr. R. A. Buchanan

(ii) Middle East Regional Air Navigation Meeting, held in Cairo, 2nd to 16th October, 1946, attended by:-

Mr. R. G. Veryard.

(iii) South Pacific Regional Air Navigation Meeting, held in Melbourne, 4th to 21st February, 1947, attended by:-

Mr. J. Durward.

(iv) South America Regional Air Navigation Meeting, held in Lima, Peru, 17th June to 7th July, 1947, attended by:-

Mr. W. R. Galloway.

(v) South Atlantic Regional Air Navigation Meeting, held in Rio de Janeiro, 15th July to 2nd August, 1947, attended by:-

Mr. J. Durward.

(vi) Special Meeting of the Meteorological Division, held in Montreal, 17th September, 1947, attended by:-

Mr. J. Durward.

3. Southern Africa Air Transport Council, Meteorological and Telecommunications Committee, held in Salisbury, Southern Rhodesia, 2nd to 3rd May, 1947, attended by:-

Mr. S.P. Peters
Mr. R.G. Veryard.

4. Conference of Directors of Empire Meteorological Services, held in Washington, 9th to 11th October, 1947, attended by:-

The Director
Mr. E. Gold
Commander C.E.N. Frankcom.

N.K. JOHNSON
Director

Meteorological Office,
Air Ministry, London, W.C.2.
October, 1947.

G.171610.

MINUTES

METEOROLOGICAL COMMITTEE

One Hundred and Sixty-Third Meeting held in the Air Council Room, Whitehall, at 11 a.m. on 27th May, 1948.

PRESENT:-

Mr. Geoffrey de Freitas, M.P. (In the Chair)
Under Secretary of State for Air.

Mr. W.J. Bigg (Colonial Office)
Professor D. Brunt (British Universities)
Professor S. Chapman (Royal Society)
Professor G.M.B. Dobson (Royal Society)
Mr. W.B. Foden (Air Ministry)
Mr. W.E.B. Griffiths (Ministry of Civil Aviation)
Mr. J.J.W. Handford (Scottish Office)
Captain W.A. Hann (Ministry of Transport)
Sir Nelson Johnson (Director, Meteorological Office)
Captain J.W. Josselyn (Admiralty)
Sir Ben Lockspeiser (Ministry of Supply)
Brigadier G.G. Mears (War Office)
Air Marshal Sir Hugh Walmsley (Air Ministry)
Dr. F.A. Williams (Ministry of Fuel and Power)
Mr. R.J. Williams (Secretary)

Apologies for absence were received from the following:-

Sir Edward Salisbury (Ministry of Agriculture and Fisheries)
Professor Sir D'Arcy Thompson (Royal Society of Edinburgh)

1405. Membership

The Director reported that the following new members had been appointed:-

Professor D. Brunt, representing the British Universities.
Dr. W.A. Macfarlane, representing the Ministry of Fuel and Power.
Air Marshal Sir Hugh Walmsley as one of the Air Ministry representatives.

It was also reported that Mr. W.E.B. Griffiths had succeeded Group Captain D.W. Bonham-Carter as the representative of the Ministry of Civil Aviation.

The Chairman extended a welcome to all the new members.

The Director stated that Professor Sir D'Arcy Thompson had written to say that he would be unable to attend this meeting owing to ill-health, and that he felt compelled to resign from the Committee as the representative of the Royal Society of Edinburgh. It was agreed that a letter should be sent to Sir D'Arcy expressing the Committee's sympathy with him in his illness and also their appreciation of his services to the Committee.

1406. Arising out of Minute 1394.

Mr. Bigg reported that the situation regarding the meteorological service in Bermuda remained as reported at the last meeting. It was agreed that the Colonial Office, the Admiralty and the Meteorological Office should continue to keep in close touch with future developments.

1407. Arising out of Minute 1396.

The Chairman recorded that to-day's meeting was the first to be held under the Committee's revised constitution and terms of reference.

1408. Arising out of Minute 1399.

The Director reported that Captain Quick wished to include a reference to the statement made at the last meeting regarding the services provided for the Merchant Navy. It was agreed that the following paragraph should be included in the Minutes:-

"In reply to Captain Quick, the Chairman stated that there would be no reduction in the services available to the Merchant Navy. The Director confirmed this."

1409. Arising out of Minute 1401.

The Director stated that the international Convention for a World Meteorological Organisation on an inter-governmental basis had now been signed by 42 states and that steps were being taken for the ratification of the Convention by the United Kingdom.

1410. The Minutes of the 162nd Meeting were confirmed subject to the addition of the paragraph agreed in Minute 1408.

1411. Annual Report of the Director for the year April 1st, 1947, to March 31st, 1948.

The Committee considered the Annual Report of the Director for the year April 1st, 1947, to March 31st, 1948, which was submitted in galley proof. (M.C.-13)

The following amendments were agreed:-

(1) Page 1. Meteorological Committee

(a) The name of the Under Secretary of State for Air should be inserted.

(b) The names of members should be given in alphabetical order.

(2) Page 1. Committee of the Meteorological Office, Edinburgh.

(a) Insert "Appointed by the Meteorological Committee".

(b) Amend "The Fishery Board for Scotland" to read "The Scottish Home Department".

(3) Page 2. Meteorological Research Committee.

The names of all members should be given and should be arranged in alphabetical order.

(4) Page 2. Introduction, para. 3, line 2. For "well advanced" read "proceeding".

(5) Page 3. Synoptic Meteorology (c) Ships' Reports (i), para. 4, line 1. For "Marid Ships", read "Certain coastal vessels (MARID ships)".

(6) Page 3. Synoptic Meteorology (c) Ships' Reports (ii), para. 1, line 6. For "18°00'W" read 18°40'W".

(7) Page 5. Services for Aviation, Services provided overseas. For "(vi) Training", make new sub-para. "(e) Examinations".

(8) Page 5. Services for the Navy. Add footnote "* The Director of the Naval Meteorological Service submits an Annual Report to the Board of Admiralty".

(9) Page 7. (c) Special Work, (vii) Inquiries, para. 2, line 3. After "Wales", add "and to the Registrar General for Scotland,".

(10) Page 8. (b) Analysis of observations, para. 1, line 2. "have been re-written. For new editions" should read "have been re-written for new editions".

(11) Page 10. (1) Establishment and strength of staff, para. 3, line 1. For "fell" read "remained".

/(12)

(12) Page 12. (i) International Meteorological Organisation, para. 4, line 1. For "The Aeronautical Commission" read "The Commission for Aeronautical Meteorology".

With reference to the statement concerning the establishment of 13 ocean weather stations in the North Atlantic (Galley Proof, page 2), the Director reported that the British, French and the joint Dutch-Belgian weather ships were now in full operation. The first ocean weather ship for the joint Scandinavian-British weather station would be ready to sail in about a week's time and the second ship would be ready shortly afterwards. The position regarding the 7 weather stations to be operated by the United States was not so satisfactory. The present position was that the United States maintained two stations in full operation while the joint United States-Canadian station was operated for half of the time by one Canadian weather ship. The Director stated that he had written (26th January, 1948) to the Chief of the United States Weather Bureau asking when additional American weather ships could be expected. The letter stressed that the route Azores - Bermuda was being operated at present under considerable difficulty because of lack of reports on or near the route. The maintenance of an ocean weather station at one or both of the agreed positions in the region near Bermuda would make a great contribution to the safe, regular and economic operation of this route. It was suggested that when the necessary appropriations were forthcoming one or both of these stations should be given the highest priority for date of opening.

The Committee felt that the present position gave cause for misgiving and stressed that the British Meteorological Service suffered from the lack of meteorological reports which the full programme was designed to provide. The Committee recommended that representations should be made to the United States Government emphasising the importance of implementing in full the scheme for ocean weather stations agreed at the Conference in London in 1946.

With regard to the work being done on meteorological research (Galley Proof, page 9), Sir Ben Lockspeiser drew attention to the importance of obtaining meteorological observations from aircraft operating in various parts of the world. It was necessary to collect and analyse routine observations of wind and weather conditions and also to arrange for special observations of gustiness and icing conditions. The Committee recommended that a joint meeting be held between the Aeronautical Research Council and the Meteorological Research Committee to consider how best to meet this problem

In connection with the training of meteorological staff (Galley Proof, page 10), Professor Brunt suggested that the initial training for scientific officers would best be done at a University. The Director pointed out that hitherto, training of Meteorological Office staff had been carried out as rapidly as possible owing to the shortage of staff. Mr. Foden thought Professor Brunt's suggestion worthy of careful consideration as soon as the staffing position permitted. The Committee agreed that the Director should examine the possibility of adopting Professor Brunt's suggestion.

The Committee accepted the Annual Report of the Director for the year April 1st, 1947 to March 31st, 1948, subject to the amendments mentioned above.

1412. Report of the Director of the Naval Meteorological Service for the period 1st April, 1947 to 31st March, 1948.

The Chairman drew the attention of the Committee to the report of the Director of the Naval Meteorological Service for the period 1st April, 1947 to 31st March, 1948. (M.C. - 14).

Captain Josselyn reported that the Admiralty were prepared to print the abbreviated report as a pamphlet. The Committee, however, did not consider this necessary as the report was primarily for the information of the Meteorological Committee.

The Committee noted the Report of the Director of the Naval Meteorological Service.

/1413.

1413. Meteorological Research - Annual Report of the Meteorological Research Committee for the year ended 31st March, 1948.

The Chairman referred to the Annual Report of the Meteorological Research Committee for the year ended 31st March, 1948 (M.C.-15) which had been submitted to the Secretary of State for Air.

The Director stated that the most important development in this report was the setting up of three sub-committees to deal with investigations in the three main branches of meteorology, viz., Instruments, Dynamical and Synoptic Meteorology and Physical Meteorology. The main Research Committee now dealt with policy and major questions, and gave broad guidance to the sub-committees.

The Committee noted the Report of the Meteorological Research Committee.

1414. Annual Report of the Meteorological Committee to the Secretary of State for Air.

The Chairman proposed that the Annual Report of the Meteorological Committee to the Secretary of State for Air should cover a period which included the meeting of the Committee normally held in May each year. He suggested that the present report (M.C.-16) should be revised to include the deliberations of the Committee at this meeting and that it should be re-circulated to members for their comments.

The Committee agreed to these proposals.

1415. Staffing Position in the Meteorological Office.

The Chairman drew the attention of the Committee to the memorandum on the staffing position in the Meteorological Office (M.C.-17).

The Director stated that the memorandum showed that the recommendations of Minute 1399 had been carried out. The exact proportions for Scientific Officers and Experimental Officers had not always been strictly observed, but if the two classes were taken together it would be seen that the policy had been followed.

The Chairman said it was gratifying to note that the recruiting position was improving. Mr. Foden stated that the Civil Service Commissioners had been asked to supply the numbers mentioned (30 Scientific Officers and 150 Experimental Officers), but the general shortage of scientists made it impossible to guarantee that these numbers would be forthcoming.

The Committee noted the present staffing position in the Meteorological Office.

1416. International Meetings.

The Committee noted the international activities of the Meteorological Office as shown in the paper M.C.-18.

1417. Date of Next Meeting.

It was agreed that the next meeting of the Committee would be held in October or November.

1418. The Committee rose at 11.55 a.

M.C. - 13

METEOROLOGICAL COMMITTEE

Annual Report
of the Director of the
Meteorological Office
presented by the Meteorological Committee
to the Secretary of State of Air
for the year
April 1st 1947, to March 31st 1948.

The Annual Report which was previously circulated in proof stage was accepted, subject to amendments, by the Committee - see Minute 1411.

M.C. -14

METEOROLOGICAL COMMITTEE

Report of the Director of
the Naval Meteorological Service
for the period
1st April 1947, to 31st March 1948.

The Report of the Director of the Naval Meteorological Service which was previously circulated was noted by the Committee - see Minute 1412.

M.C. - 15

METEOROLOGICAL COMMITTEE

Report of the Meteorological Research Committee

to the

Secretary of State for Air

for the year ended 31st March 1948.

The Report of the Meteorological Research Committee (M.R.P. 384) which was previously circulated was noted by the Committee - see Minute 1413.

M.C. - 16.

METEOROLOGICAL COMMITTEE

AIR MINISTRY

ANNUAL REPORT OF THE METEOROLOGICAL COMMITTEE TO THE SECRETARY OF STATE FOR AIR FOR THE PERIOD 1 APRIL, 1947, TO 30 JUNE, 1948

1. The Meteorological Committee met twice during the period on the 30 October, 1947 and the 27 May, 1948.

2. Membership

(i) The following new members have been appointed.
Professor D. Brunt, representing the British Universities.
Dr. W.A. Macfarlane, representing the Ministry of Fuel and Power.
Air Marshal Sir Hugh Walmsley, as one of the Air Ministry representatives.

(ii) Captain J.W. Josselyn, Director of the Naval Meteorological Service, has been appointed to replace Rear Admiral A.G.N. Wyatt, the Hydrographer, as the representative of the Admiralty.
Mr. W.E.B. Griffiths has been appointed to succeed Group Captain D.W.F. Bonham-Carter as the representative of the Ministry of Civil Aviation.

(iii) Professor Sir D'Arcy Thompson resigned his membership as representative of the Royal Society of Edinburgh owing to ill-health. His successor has not yet been appointed.

3. Functions and Constitution

The original functions and constitution of the Committee were approved in 1920. since then the Meteorological Office has grown into an important and integral part of the Government machine and its administration by a committee is no longer practicable. The Committee, therefore, approved a revised constitution and terms of reference for the Committee which make provision for it to advise the Secretary of State for Air on matters referred to it concerning the State Meteorological Service. The revised constitution also provides for the representation of the British Universities and the Ministry of Fuel and Power in addition to the Government Departments and learned societies already represented on the Committee.

4. Re-organisation of the Meteorological Office.

The Committee noted the progress made in the re-organisation of the Meteorological Office following the Government's proposals for improved conditions in scientific establishments in Government Departments. (Barlow Report on the Scientific Civil Service. (Cmd.6679)). Agreement has been reached with the Treasury on the proposed organisation and establishments. For the higher appointments in the Meteorological Office the Treasury have approved a Principal Deputy Director and three deputy director posts and thirteen Senior Principal Scientific Officer posts. The sub-committee appointed by the Committee to advise the Secretary of State for Air upon senior appointments made recommendations for filling the deputy director posts and the appointments have now been made. Appointments to the Senior Principal Scientific Officer posts have also been made.

The Committee also noted that a scheme was under consideration for organising the forecasting services at home on a regional basis. In the meantime, the out-station organisation will continue mainly on a functional basis, but will aim at a steady transition to a regional plan.

5. Allocation of Manpower in the Meteorological Office.

The Committee considered and agreed to proposals made by the Director for the allocation of the available manpower of the Meteorological Office between User Departments. The allocation suggested will be on the basis of 100% for the Central Forecasting Office and the principal Air Traffic Centres at home and overseas, 90% for meteorological research, and between 70 - 75% for Headquarters (administrative and technical) and outstations in general.

/Towards

.202,601/L.W/8/48.

Towards the end of the period under review the Committee noted that the outlook for recruiting appeared somewhat brighter but the general shortage of scientific staff made it impossible to guarantee that the numbers required by the Meteorological Office would be forthcoming.

6. Meteorological Research

The Committee noted the Reports of the Meteorological Research Committee for the years ended 31 March, 1947 and 31 March, 1948. In the former report the Committee noted the work being done in connection with agricultural meteorology. In the latter report the most important development was the formation of three sub-committees to deal with investigation in the three main branches of Meteorology, viz. Instruments, Dynamical and Synoptic Meteorology and Physical questions, and gives broad guidance to the sub-committees.

7. Report of the Director of the Meteorological Office

The Committee accepted the Reports of the Director for the period August, 1945, to 31 March, 1947, and for the year 1 April, 1947 to 31 March, 1948, subject to some minor amendments.

8. Report of the Director of the Naval Meteorological Service.

The Committee received an abridged Report of the Director of the Naval Meteorological Service for the period 1 April, 1947 to 31 March, 1948, which the Board of Admiralty agreed should be circulated for the information of the Meteorological Committee.

9. Colonial Meteorology.

The Committee noted the decision of the Colonial Civil Aviation Conference held in London in April, 1947, not to proceed with the proposal to form a single centrally controlled meteorological service for the Colonies. The meteorological service in the West Indies, organised by the Meteorological Office during the war, would continue for the present, at least, to be administered by the Meteorological Office, and the meteorological service in the Falkland Islands would also be provided by the Meteorological Office. The Committee further noted that the Meteorological Office would continue to give such advice and assistance as might be required by the colonial meteorological services, and would continue to act as adviser to the Colonial Office in matters relating to meteorology in the Colonies.

10. International Meteorology.

The Committee noted the large contribution which the Meteorological Office has made and is making in the field of international meteorology. The Committee received a report upon the Conferences, Committees and Commissions of the International Meteorological Organisation which had taken place during 1946 and 1947, at London, Paris, Toronto and Washington. It noted especially the decision of the International Meteorological Organisation to transform itself by means of a Convention into an intergovernmental body with the title of the World Meteorological Organisation and to seek affiliation to the United Nations as a specialised agency.

The Committee also noted the various international meetings attended by the staff of the Meteorological Office during the first half of 1948, and the proposed arrangements for attendance at meetings in August, 1948, in particular the General Assembly of the International Union of Geodesy and Geophysics in Oslo during the latter half of August.

Geoffrey de Freitas

Chairman

19th July, 1948.

METEOROLOGICAL COMMITTEE

M.C.-17

AIR MINISTRY

STAFFING POSITION IN THE METEOROLOGICAL OFFICE

Paper M.C.-10, which discussed the commitments of the Meteorological Office and the staff available to meet them, was submitted to the Committee at its last meeting. In the interval, the situation has changed in the following respects:

(a) Treasury approval has been obtained for a bigger total of staff to cover 'permanent' requirements,

(b) the strength of staff has declined rather more quickly than was visualised last October, and

(c) the outlook for recruitment is now better than was expected last October.

2. Establishments and Present Strength of Staff

In addition to the 'permanent' peace time requirement of staff, the Meteorological Office has a temporary diminishing requirement, resulting primarily from the occupation by British Forces of ex-enemy territory.

The following table shows the 'permanent' establishment of staff now approved by the Treasury and the temporary requirement as at 1st May.

	Permanent Requirements	Temporary Requirements	Total
Scientific Officer Class	190	8	198
Experimental Officer Class	682	53	735
Senior Assistants	129	9	138
Assistants	1279	99	1378
Locally entered Assistants	267	97	364
Clerical Officer posts	36	-	36

Assistants have been obtained in sufficient numbers to fill all the posts in the grade. There is a serious deficiency in officer grades, as the following comparison between established posts and effective strength* in officer grades shows:

	Posts	Strength
Scientific Officer Class	198	152
Experimental Officer Class	735	551

3. Allocation of officerd

The following table shows how these 152 Scientific Officers and 551 Experimental Officers are allocated at present among the various users, in relation to the establishments of staff:

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* In computing the 'effective strength' of the Experimental Officer Class allowance has been made for the fact that 16 Experimental Officers are employed in Clerical Officer posts and 49 in Senior Assistant posts.

	S.O.CLASS			E.O. CLASS		
	Establishment of staff	Strength	%	Establishment of staff	Strength	%
1. H.Q. Admin. and Technical	44	38	86*	54	40	74
2. C.F.O. Routine	15	15	100	19	19	100
3. Air Traffic Control Centres and R.A.F. Home.	42	27	64**	282	219	78**
4. Civil Aviation Home	17	13	76	153	92	60
5. R.A.F. & Civil Aviation O'Seas	18	11	61	80	57	70
6. War Office & Ministry of Supply	7	5	72	10	8	80
7. Research	30	26	87	22	11	50
8. Observatories and Agriculture	11	7	64	12	8	67
9. Special (Weather ships, Radio Sonde etc.)	-	-	-	24	24	100
10. Training and posting pools (Travel, foreign service leave, etc.)	6	3	50	26	20	77
Total (without diminishing requirements)	190	145	76	682	498	73
11. Diminishing requirements	8	7	87	53	53	100
Total (including diminishing requirements)	198	152	77	735	551	75

* Directing posts are filled 100%

** Air Traffic Control Centres in full operation are manned to 100% of requirements.

The table shows that the principles governing the allocation of staff, suggested to and approved by the Committee last October, have been followed. For instance, 100% of established staff in officer grades has been provided for the Central Forecast Office, for Radio Sonde, and for Ocean Weather Ships. Approximately 90% of requirements for research has been provided in the Scientific Officer class, but the percentage allocated in the Experimental Officer Class is not yet so high. The research branches have only recently been formed and they are not yet engaged on a full programme of work.

The low percentage of Experimental Officers in Civil Aviation at home and overseas is explained partly by the fact that, in determining 'establishments' provision has been made for development, which has not yet materialised.

/4....

4. Future Prospects

The figures in the above table explain why great difficulty id being experienced in maintaining an efficient meteorological service and some anxiety is felt over possible further losses of staff in the next few months.

We have now virtually come to an end of the loss of uniformed personnel consequent upon releases from the Forces. Our losses in the next few months will result from resignations of temporary and established civilian staff. The number of such resignations is extremely difficult to estimate. It is known that some members of staff are applying for appointments in the Dominions and the Colonies. There is, however, a fair expactation that resignations will not worsen the position seriously before recruitment has begun to be effective.

The Civil Service Commissioners have been asked to assign 30 Scientific Officers and 150 Experimental Officers to the Meteorological Office from among successful candidates in this year's competition for entry into the Scientific Civil Service. It is therefore hoped that present staffing difficulties will have largely disappeared early in 1949: this estimate allows for some six months training for new entrants, before they are regarded as effective.

Meteorological Office,
Air Ministry,
London, W.C.2.
May, 1948.

METEOROLOGICAL COMMITTEE

AIR MINISTRY

INTERNATIONAL MEETINGS. (November 1947 to May 1948).

Meetings of various international organisations have been attended by members of the staff of the Meteorological Office as follows:-

1. INTERNATIONAL METEOROLOGICAL ORGANISATION.

(i) Telecommunications Sub-Commission for Western Europe of Regional Commission VI (Europe) (Teleprinter Panel), held in Brussels, 16th to 19th March, 1948, attended by:-

Mr. C.V. Ockenden.

(ii) Commission for Synoptic Weather Information, Special Meeting, held in De Bilt, 23rd to 27th March, 1948, attended by:-

Commander C.E.N. Frankcom.

(iii) Regional Commission VI (Europe), held in Paris, 5th to 10th April, 1948, attended by:-

Mr. E.G. Bilham.

2. INTERNATIONAL CIVIL AVIATION ORGANISATION.

(i) European - Mediterranean Regional Air Navigation Meeting, held in Paris, 4th to 15th May, 1948, attended by:-

Mr. W.H. Bigg.
Mr. E. Chambers.

(ii) North Atlantic Regional Air Navigation Meeting, held in Paris, 17th to 31st May, 1948, attended by:-

Mr. J. Durward.
Mr. E. Chambers.

3. Preparatory Committee of Experts on Co-ordination of Safety of Life at Sea and in the Air, held in London, 27th January to 6th February, 1948, attended by:-

Commander C.E.N. Frankcom, as representative of the International Meteorological Organisation.

4. Inter-Governmental Maritime Organisation Conference (United Nations), held in Geneva, 19th February to 4th March, 1948, attended by:-

Commander C.E.N. Frankcom, as representative of the International Meteorological Organisation.

5. International Convention for the Safety of Life at Sea, held in London, commencing 23rd April 1948, attended by:-

Commander C.E.N. Frankcom, as a member of the United Kingdom Delegation and also as representative of the International Meteorological Organisation.

/ FORTHCOMING MEETINGS.

FORTHCOMING MEETINGS.

1. INTERNATIONAL METEOROLOGICAL ORGANISATION.

Executive Council, to be held in Oslo, 12th to 18th August, 1948, will be attended by:-

The Director. (President)

2. INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS.

General Assembly and Meetings of the Associations, to be held in Oslo, 18th to 29th August, 1948, will be attended by:-

The Director.
Dr. J.M. Stagg. (General Secretary of the Union)
Mr. C.S. Durst.

3. INTERNATIONAL CIVIL AVIATION ORGANISATION.

Indian Ocean Regional Air Navigation Meeting, to be held in Africa (place not yet decided), in August, 1948, will be attended by:-

Mr. J. Durward.
Mr. W.H. Bigg.

N.K. JOHNSON.
Director.

Meteorological Office,
Air Ministry, London, W.C.2.
May, 1948.

TELEGRAMS: WEATHER LONDON.
TELEPHONE: HOLBORN 3434.

METEOROLOGICAL OFFICE,
AIR MINISTRY,
ADASTRAL HOUSE,
KINGSWAY,
LONDON, W.C. 2

A.968486/48/D.M.O.

2 November, 1948.

Dear Sir,

In the ordinary course of events the Meteorological Committee would be due to hold a meeting within the next month or so. The number of matters which could profitably be discussed at such a meeting is small, although there are a few matters which should be communicated to members. The Chairman of the Committee has therefore instructed me to write to you and say that he does not propose to call an actual meeting unless members particularly wish him to do so. He proposes that the information contained in the latter part of this letter be regarded as officially communicated to members, and as taking the place of a formal meeting.

2. It is with deep regret that we have to place on record the death of Professor Sir D'Arcy Thompson, who represented the Royal Society of Edinburgh on the Committee. A letter of condolence, expressing appreciation of Sir D'Arcy's services to the Committee, was sent to Lady Thompson by the Chairman.

3. The Report of the Committee for the period 1st April, 1947, to 30th June, 1948, has been sent to the Secretary of State, who asks that his warm appreciation of the work done by the members of the Meteorological Committee be conveyed to them.

4. In accordance with the recommendation made at the last meeting of the Committee, a joint meeting of the Meteorological Research Committee and the Aeronautical Research Council was held on 12th October, to examine what further measures could be taken to secure more information about the meteorological conditions at high levels over the globe. A number of valuable recommendations were made, and it was decided to hold another joint meeting in a year's time to review progress.

5. The staffing position in the Meteorological Office is less satisfactory than had been hoped at the time of the last meeting of the Committee. This is due in part to the continuation of resignations of staff and in part to the limited measure of success in recruiting new staff.

Steps are being taken to rectify both these difficulties, but a continued shortage of staff must be expected for some little time since the lack of adequate numbers of employees is general and not confined to the Meteorological Office.

6. In view of the present international situation, and in common with the general policy of His Majesty's Government, steps are being taken to revive the Meteorological Branch of the R.A.F.V.R. with a view to having available an adequate reservation of trained personnel who can be called upon in the event of a National emergency.

7. The most important international conference which has been held since the last meeting of the Committee was the General Assembly of the International Union of Geodesy and Geophysics at Oslo in August. This was attended by the Director and the Assistant Director for Investigations (Mr. Durst); the Principal Deputy Director (Dr. Stagg) attended in his capacity as Secretary General of the Union.

The Regional Commission for South America of the International Meteorological Organisation held a meeting at Buenos Aires in July. Mr. Frost, the Senior Meteorological Officer in the British West Indies, attended to watch the interests of the Meteorological Office in this area.

8. Members of the Committee may be interested to learn that information has recently been received that the United States have authorised the provision of their full complement of Ocean Weather Ships in the North Atlantic, and the complete programme is likely to be achieved within about six months.

9. Unless a reply is received from you, it will be assumed that you agree with the Chairman's suggestion contained in the opening paragraph of this letter.

Yours faithfully,

R J Williams

R.J. WILLIAMS.

Secretary,
Meteorological Committee.

MINUTES.

METEOROLOGICAL COMMITTEE

One Hundred and Sixty-Fourth Meeting,
held in the Air Council Room, Air Ministry,
King Charles Street, Whitehall at 11 a.m. on
26th May, 1949.

PRESENT:-

Mr. Geoffrey de Freitas, M.P. (In the Chair)
Under Secretary of State for Air.

Mr. W.J. Bigg (Colonial Office)
Professor S. Chapman (Royal Society)
Air Commodore N.H. D'Aeth (Air Ministry)
Professor G.M.B. Dobson (Royal Society)
Mr. W.B. Foden (Air Ministry)
Professor W.M.H. Greaves (Royal Society of Edinburgh)
Mr. W.E.B. Griffiths (Ministry of Civil Aviation)
Sir Nelson Johnson (Director, Meteorological Office)
Brigadier E. Lindsay (War Office)
Captain F.M. Walton (Admiralty)
Mr. R.J. Williams (Secretary)

Apologies for absence were received from the following:-

Professor D. Brunt (British Universities)
Captain J.H. Quick (Ministry of Transport)
Sir Edward Salisbury (Ministry of Agriculture and Fisheries)

1419. Membership

The Chairman reported the following changes in the Membership of the Committee:-

Professor W.M.H. Greaves, F.R.S., Astronomer Royal for Scotland, has been appointed to succeed the late Professor Sir D'Arcy Thompson as the representative of the Royal Society of Edinburgh.

Major General S.B. Rawlins, C.B., C.B.E., D.S.O., M.C. has been appointed to succeed Major General C.G.G. Nicholson as the War Office representative.

Captain F.M. Walton, R.N. has succeeded Captain J.W. Josselyn, D.S.C., R.N. as Director of the Naval Meteorological Service, Admiralty.

Mr. H.R. Smith has been appointed to succeed Mr. J.J.W. Handford as the representative of the Scottish Office.

It was also reported that the post of Chief Scientist, Ministry of Supply was at present vacant and a representative to succeed Sir Ben Lockspeiser had not yet been appointed.

The Chairman mentioned that the Ministry of Fuel and Power had expressed their desire to allow their representation on the Committee to lapse, but he proposed to recommend to the Secretary of State for Air that the Ministry of Fuel and Power should be asked to reconsider their decision and continue to be represented on the Meteorological Committee.

1420. The Minutes of the 163rd Meeting held on 27th May, 1948 were confirmed.

1421. Arising out of Minute 1406.

Mr. Bigg referred to the meteorological arrangements in Bermuda. As this matter is also mentioned in the Annual Report of the Director of the Naval Meteorological Service, Section A, para. 5.1. (M.C.-20), it was agreed to leave this question for discussion later in the meeting when M.C.-20 was considered. (see minute 1424).

1422. Arising out of Minute 1411

With regard to the question of obtaining observations on icing and gustiness from aircraft operating in various parts of the world, Air Commodore D'Aeth referred to the contributuion which the Royal Air Force, and in particular Transport Command, has made.

With regard to the recommendation made by the Committee at their last meeting that a joint meeting be held between the Aeronautical Research Council and the Meteorological Research Committee to consider this problem, the Director reported that a joint meeting had been held on 12th October, 1948 under the chairmanship of Dr. Dobson and this meeting had made the following recommendations:-

(a) to extend wind and temperature statistics to a height of 60,000 to 70,000 feet over the whole world;

(b) to investigate the nature and intensity of gusts likely to be encountered by aircraft. This should include the investigation of clear air turbulence;

(c) to examine drop size distribution and liquid water content in the most severe icing conditions likely to be encountered;

(d) to hold another joint meeting in about a year's time (i.e. towards the end of 1949).

Dr. Dobson mentioned the difficulty of measuring gustiness in extreme conditions, and referred to the "clear-air" gustiness found at high levels which appeared to be due to horizontal fluctuations of the wind rather than to vertical convection.

In reply to the Chairman, Mr. Griffiths confirmed that the Ministry of Civil Aviation were participating actively in this investigation.

With reference to the establishment of ocean weather stations in the North Atlantic Ocean, the Director reported that in accordance with the recommendation made by the Committee at their last meeting, representations were made to the United States Authorities emphasising the importance of implementing in full the scheme agreed at the London Conference in 1946. Information was received later that provision had been made by the United States to complete their full complement of ocean weather ships in the North Atlantic and that the complete programme was likely to be achieved by mid-1949. The position had now changed since a conference convened by the International Civil Aviation Organisation held in London last month had reviewed the 1946 arrangements for ocean weather stations in the North Atlantic and it had been agreed to reduce the number of ocean weather stations from 13 to 10. The reduction was based mainly on economic and financial considerations. In reply to the Chairman the Director confirmed that the International Civil Aviation Organisation was satisfied that the reduction and redistribution of the ocean weather stations would not seriously affect the objects the scheme was designed to provide. The ten stations had been re-arranged with the object of providing a service not much inferior to the one which would have been provided by the thirteen stations originally selected.

The Chairman enquired whether the results obtained from ocean weather ships now in operation had proved of value to weather forecasting generally. The Director stated that there was no doubt about the value of the observations to the meteorological services of Western Europe and North America but it was difficult to express this value in numerical terms.

Professor Chapman asked whether the smaller countries assisted in the scheme. The Director replied that Belgium had handed over to Holland the operation of the joint Belgian-Dutch station and, together with Portugal and Eire, was now making a cash contribution towards the cost of the ocean weather ship scheme.

Mr. Bigg enquired whether it was proposed to establish stations in the Pacific Ocean and the Director stated that he understood that the United States and Canada were planning the establishment of such stations. The Director also mentioned a proposal by France to establish ocean weather stations in the South Atlantic between West Africa and Brazil.

In connection with the suggestion by Professor Brunt that the initial training for scientific officers should be done at a University, the Director stated that the staffing position in the Meteorological Office did not yet permit the possibility of adopting Professor Brunt's suggestion, but the question would be considered when the staffing position improved.

1423. Annual Report of the Director of the Meteorological Office for the year April 1, 1948, to March 31, 1949.

The Committee considered the Annual Report of the Director for the year April 1, 1948, to March 31, 1949, which was submitted in galley proof. (M.C.-19).

Page 2. Committee of the Meteorological Office, Edinburgh.

The Director reported that it had been decided to resume the activities of the Committee of the Meteorological Office, Edinburgh. The membership had been reviewed and brought up-to-date and a meeting of the Committee was being held on 9 June, 1949.

Page 3. 1. Functions of the Meteorological Office, para. 4, line 2.

(a) Central Forecasting Office, paras. 3 - 4.

The Director mentioned that the introduction on 1 January, 1949 of the new international code recommended by the Conference of Directors in Washington in 1947 had been in the nature of a major operation, but had been carried out on a world wide basis without any dislocation of the normal services provided.

Page 6. (4) Services for Civil Aviation. (b) Services in the United Kingdom for trunk routes.

The Director referred to the extension of the teleprinter system at London Airport to ensure rapid dissemination of meteorological information to the operating agencies at the airport.

Page 8. (g) Services for the Dominions, Colonies, etc. (b) India Area.

The Director referred to the arrangements which had been made for the training of personnel from Pakistan and Ceylon at the Meteorological Office Training School. In this connection the Director mentioned that the instruction was being given to German personnel in the British Zone of Germany in the use of the new procedures following the introduction of the new international codes, with a view to their releasing British forecasters in Germany. The calibre of the students was very good.

Page 9. (i) British Climatology (d) Publications - Observatories Year Book.

Professor Greaves emphasised the importance of publishing the results of geophysical observations and asked whether the material to be published in the Observatories Year Book had been worked up. The Director confirmed that the results were ready for publication. Professor Chapman urged that priority should be given to the publication of these records. The Chairman considered that if the number of copies required was not large the question resuming publication of the Observatories Year Book by a non-printing process should be looked into (see also the discussion on page 14 (5)).

Page 14. (5) Work at the Observatories and Geophysical Research.

Professor Greaves referred to the need for analysing and utilising the data already made at the Observatories. The Director stated that the recording of the observations had been fully maintained but the shortage of suitable staff precluded a full analysis of the data. It was intended to make the Meteorological Office, Edinburgh, the main centre for analysing the records of the Scottish observatories. In this connection the Director referred to a letter which he had received from Sir Edward Appleton regarding the establishment of a Solar-Terrestrial Relations Working Group at Edinburgh University. A reply had been sent to Sir Edward Appleton stating that the Meteorological Office in Edinburgh would co-operate fully with the group in matters concerning meteorology and terrestrial magnetism. The importance of the observations of magnetic phenomena from Lerwick Observatory in connection with other geophysical research was emphasised by Professor Greaves and Professor Chapman.

Page 16. (b) Establishment and strength of staff.

The figures for the strength of the staff of the Office on 31 March, 1949, were given by the Director, who drew attention to the fact that the strength in the officer grades was appreciably below the establishment approved to meet the permanent requirements of the Office. The figures are as follows:-

	Permanent Requirements.	Strength on 31.3.49.
Scientific Officer Class	190	152
Experimental Officer Class	682	515

Professor Greaves stated that he had found considerable reluctance among University students to join the Meteorological Office. The Director stated that as a result of the necessity for the employment of a large proportion of the staff during the war on routine forecasting, the impression had grown that the Meteorological Office did not give an opportunity to the student who wished to take up research as a career. Every endeavour was being made to rectify this impression and to stress the fact that in the present organisation of the Office there are opportunities for research. Another factor which contributed to the problem of recruiting was that many stations of the Meteorological Office are situated at remote places in the United Kingdom whilst a number are overseas.

The Chairman asked what steps were being taken to combat the impression in the Universities about research work. The Director stated that the Universities had been asked to co-operate in directing the attention of first and second year students to the science and problems of Meteorology before the student had decided to specialize in some other branch of physics. The research side of the Meteorological Office was continually being emphasised in lectures and other means.

Professor Greaves suggested that more research might be undertaken within the Meteorological Office. The Director mentioned that a Meteorological Office Order on this subject had recently been issued drawing attention to three classes of research which could be undertaken by members of the staff, viz:-

(a) research done as whole time work in a post within the approved establishment of research posts;

(b) research done as part time office work;

/(c)

(c) private research carried out in the officer's own time.

The Order indicated the best way the above could be accomplished.

The Director reported that the Treasury scheme whereby vacation students are attached to research establishments in Government Departments has been adopted by the Meteorological Office, and 12 students will be selected for attachment during the coming long vacation. The students will be attached to the research establishments of the Office.

Dr. Dobson mentioned that two of his students at Oxford were participating in the scheme this summer.

The Chairman asked whether any further steps should be taken to improve the recruitment of suitable staff to the Meteorological Office but the Committee considered that nothing further could usefully be done at this stage.

Page 17. (3) Supply of Instruments (d) Testing and calibrating.

The Director drew attention to the statement that instrument makers were now able to undertake the calibration of radio-sondes thereby relieving the Office of this work. He regarded this as an important development.

The Committee accepted the Annual Report of the Director for the year April 1, 1948, to March 31 1949, subject to a few editorial amendments.

1424. Annual Report of the Director of the Naval Meteorological Service, 1st April, 1948, to 31st March, 1949.

The Chairman drew the attention of the Committee to the Annual Report of the Director of the Naval Meteorological Service for the year 1, April, 1948, to 31 March, 1949, (M.C. - 20).

Captain Walton referred briefly to the more important items in the Report. The Director remarked that close liaison was maintained between the Meteorological Office and the Naval Meteorological Branch and he wished to express his appreciation to Captain Walton.

Mr. Bigg referred to Section A, para. 5.1 which referred to the meteorological service in Bermuda, and stated that owing to the shortage of forecasting staff the Bermuda Government would be unable to re-introduce the Fleet Synoptic broadcasts which ceased when the Royal Navy Weather Centre was closed in March this year.

Captain Walton stated that the Admiralty were taking steps to ascertain whether H.M. Ships on the West Indies Station were able to obtain satisfactory meteorological information since the closing down of the R.N. Weather Centre in Bermuda last March. If this enquiry showed that the present situation was not satisfactory, D.N.M.S. would take the matter up with the Colonial Office, in consultation with D.M.O.

1425. Meteorological Research - Annual Report of the Meteorological Research Committee to the Secretary of State for Air for the year ended 31 March, 1949.

The Chairman referred to the Annual Report of the Meteorological Research Committee for the year ended 31 March, 1949, (M.C. - 21) which had been submitted to the Secretary of State for Air.

The Director drew the attention of the Committee to para. 4 of the Report which referred to the setting up of three sub-committees to deal with investigations in instruments, in synoptic and dynamical meteorology and in physical problems of meteorology respectively. The sub-committees were working extremely well and the main Research Committee was now free to deal with matters of policy and major questions.

The Director referred to the work done during the year in reviewing the field of dynamical problems in relation to forecasting and to selecting the best lines of attack on these problems. The question of development and changes in type in the weather situation had been intensively studied in the light of analysis of northern hemisphere charts of surface pressure, pressure contours and thickness patterns of atmospheric layers.

The Director also referred to the difficulty of using rockets to obtain meteorological data at 100,000 feet or above in this country, and mentioned the work being done in the United States. Professor Dobson reported that the Americans had recently requested Professor Paneth's help in analysing the samples of air collected in these experiments. Professor Chapman referred to a decision of the Physical Sub-Committee of the Meteorological Research Committee to invite the Americans to include in their experiments some measurements of the temperature in the high atmosphere by timing the sound of explosions produced by the rockets at a series of heights.

The Committee noted the Report of the Meteorological Research Committee.

1426. Annual Report of the Meteorological Committee to the Secretary of State for Air.

The Chairman referred to the Annual Report of the Meteorological Committee to the Secretary of State for Air for the period 1 July, 1948, to 30 June, 1949, (M.C. - 22) and mentioned that para. 2 about the membership of the Committee would require amendment in accordance with the changes reported at the beginning of the meeting (Minute 1419).

The Committee approved the Annual Report subject to the above amendments.

1427. International Meetings.

The Director reported the the international activities of the Meteorological Office have continued at a high level. Several regional air navigation meetings have been held by the International Civil Aviation Organisation and it was gratifying to note the large amount of co-operation and agreement which existed between the International Meteorological Organisation and the International Civil Aviation Organisation at these meetings.

The Committee noted the international activities of the Office as shown in the paper M.C. - 23.

1428. Date of Next Meeting.

The Chairman suggested that the date of the next meeting should be left open, and it was agreed that a meeting would be held in the autumn if there were sufficient matters for discussion.

1429. The Committee rose at 12.20 p.

M. C. - 19

METEOROLOGICAL COMMITTEE

Annual Report
of the Director of the
Meteorological Office
presented by the Meteorological Committee
to the Secretary of State for Air
for the year
April 1st 1958 to March 31st 1949.

The Annual Report which was previously circulated in proof stage was accepted, subject to editorial amendments, by the Committee - see Minute 142~~8~~.3

M.C. - 20

METEOROLOGICAL COMMITTEE

Annual Report of the Director
of the Naval Meteorological Service
10th April, 1948 - 31st March 1949.

The Annual Report of the Director of the Naval Meteorological Service which was previously circulated, was noted by the Committee - see Minute 1424

M.C. - 21

METEOROLOGICAL COMMITTEE

Report of the Meteorological Research Committee
to the
Secretary of State for Air
for the year ended 31st March 1949.

The Report of the Meteorological Research Committee (M.R.P. 478) which was previously circulated was noted by the Committee - see Minute 1425.

METEOROLOGICAL COMMITTEE

AIR MINISTRY

ANNUAL REPORT OF THE METEOROLOGICAL COMMITTEE TO THE SECRETARY OF STATE FOR AIR FOR THE PERIOD 1 JULY, 1948, TO 30 JUNE, 1949

1. The Meteorological Committee met on 26 May, 1949. The formal meeting due to be held in November, 1948, was not convened as there were no matters of sufficient importance requiring discussion by the Committee. The Committee were informed by letter of those matters which it was necessary to bring to their attention.

2. Membership.

The following changes have taken place in the membership during the year :-

Professor W.M.H. Greaves, F.R.S., Astronomer Royal for Scotland, has been appointed to succeed the late Professor Sir D'Arcy Thompson as the representative of the Royal Society of Edinburgh.

Major General S.B. Rawlins, C.B., C.B.E., D.S.O., M.C., has been appointed to succeed Major General C.G.G. Nicholson as the War Office representative.

Captain F.M. Walton, R.N. has succeeded Captain J.W. Josselyn, D.S.C., R.N. as Director of the Naval Meteorological Service, Admiralty.

Mr. H.R. Smith has been appointed to succeed Mr. J.J.W. Handford as the representative of the Scottish Office.

The post of Chief Scientist, Ministry of Supply, is at present vacant and a representative to succeed Sir Ben Lockspeiser has not yet been appointed.

3. Organisation of the Meteorological Office.

The reorganisation of the Meteorological Office on the lines of the Barlow Report on the Scientific Civil Service has been completed and the new organisation is working satisfactorily.

4. Staffing of the Meteorological Office.

The staffing position in the Meteorological Office is less satisfactory than had been hoped at the time of the last Annual Report. This is due in part to the continuation of resignations of staff and in part to the limited measure of success in recruiting new staff. All practical steps are being taken to rectify matters, but a shortage of staff must be expected to persist for some time since the lack of scientific and technical staff is general and not confined to the Meteorological Office.

The allocation of the available manpower of the Office between user Departments continues on the basis of the recommendations made by the Committee in their last Annual Report.

5. Royal Air Force Volunteer Reserve.

In accordance with the general policy of His Majesty's Government steps have been taken to revive the Meteorological Branch of the Royal Air Force Volunteer Reserve with a view to having available an adequate reserve of trained personnel who can be called upon in the event of a national emergency. The response to the appeal for volunteers has been fairly satisfactory and arrangements are being made for their training.

/6.

6. Meteorological Research.

The Committee noted the Report of the Meteorological Research Committee for the year ending 31 March, 1949. The formation of the new sub-committees to deal with investigation in the three main branches of meteorology, viz., Instruments, Dynamical and Synoptic Meteorology and Physical Questions, has greatly facilitated the work of the Meteorological Research Committee. All possible steps are being taken to increase the proportion of scientific officer staff engaged in research problems. During the year members of the Meteorological Research Committee and of the Meteorological Office lectured on selected meteorological problems at several Universities.

7. Report of the Director of the Meteorological Office.

The Committee received the Report of the Director of the Meteorological Office for the year 1 April, 1948, to 31 March, 1949, and presented it (after amendment) to the Secretary of State for Air.

8. Report of the Director of the Naval Meteorological Service.

The Committee received an abridged Report of the Director of the Naval Meteorological Service for the year 1 April, 1948, to 31 March, 1949.

9. International Meteorology.

The Committee noted the active part which the staff of the Meteorological Office continues to play in the field of international meteorology.

GEOFFREY DE FREITAS

Chairman

29 July, 1949.

AIR MINISTRY

INTERNATIONAL MEETINGS (June, 1948 to May, 1949)

Meetings of international organisations have been attended by members of the staff of the Meteorological Office as follows:-

1. INTERNATIONAL METEOROLOGICAL ORGANISATION.

(i) Telecommunications Sub-Commission of the Regional Commission VI (Europe) held in London, 5th to 10th July, 1948, attended by:-

The Director
Mr. C.V. Ockenden
Mr. N.G. Grandy.

(ii) Executive Council, held in Oslo, 12th to 18th August, 1948, attended by:-

The Director (President).

(iii) Regional Commission III (South America), held in Buenos Aires, 6th to 15th September, 1948, attended by:-

Mr. R. Frost.

(iv) Regional Commission II (Asia), held in New Delhi, 10th to 20th November, 1948, attended by:-

Mr. W.H. Bigg
Mr. G. Needham.

2. INTERNATIONAL CIVIL AVIATION ORGANISATION

(i) South East Asia Regional Air Navigation Meeting, held at New Delhi, 23rd November to 14th December, 1948, attended by:-

Mr. W.H. Bigg
Mr. G. Needham.

(ii) Africa-Indian Ocean Regional Air Navigation Meeting, held in London, 22nd March to 14th April, 1949, attended by:-

Mr. W.H. Bigg
Mr. D.A. Davies
Mr. G. Hurst.

(iii) North Atlantic Meteorological Telecommunications Meeting, held in London, 11th to 16th April, 1949, attended by:-

The Director
Mr. E.G. Bilham
Mr. J. Durward
Commander C.E.N. Frankcom.

(iv) Conference on Joint Financing and Operation of Air Navigation Services (including North Atlantic Ocean Weather Ships), held in London, 20th April to May, 1949, attended by:-

The Director
Mr. E.G. Bilham
Mr. J. Durward
Commander C.E.N. Frankcom
Mr. E.J. Bell.

/3.

3. INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS

General Assembly and Meetings of the Associations, held in Oslo, 18th to 29th August, 1948, attended by:-

The Director
Dr. J.M. Stagg (General Secretary of the Union)
Mr. C.S. Durst.

4. INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS

Meeting of the Executive Committee, held in Brussels, 14th to 16th September, 1948, attended by:-

Dr. J.M. Stagg

N.K. JOHNSON
Director.

Meteorological Office,
Air Ministry, London, W.C.2.

May, 1949

TELEGRAMS: WEATHER LONDON.
TELEPHONE: HOLBORN 3434.

METEOROLOGICAL OFFICE,
AIR MINISTRY,
ADASTRAL HOUSE,
KINGSWAY,
LONDON, W.C. 2

A. 968486/48/D.M.O.

5 December ~~November~~, 1949.

Dear Sir,

Last year the meeting of the Meteorological Committee due to be held towards the end of November did not take place as the number of matters which could profitably be discussed at such a meeting was small. A letter containing information on matters of interest was circulated to members, and it was agreed to regard this letter as taking the place of a formal meeting. A similar situation has arisen this year, and the Chairman of the Committee has instructed me to write to you and say that he does not propose to call a formal meeting in the near future unless members particularly wish him to do so. He again proposes that the information contained in this letter be regarded as officially communicated to members and as taking the place of a formal meeting.

2. The Annual Report of the Meteorological Committee for the period 1st July 1948 to 30th June 1949 was submitted to the Secretary of State for Air on 29th July 1949.

3. Mr. H.M. Garner, C.B., has been nominated to succeed Sir Ben Lockspeiser as Ministry of Supply representative on the Meteorological Committee (Minute 1419 of the last meeting).

4. In accordance with the recommendation made at the last meeting of the Committee, consideration has been given to the question of resuming the publication of the Observatories Year Book. Apart from the method of reproduction to be employed, it has been necessary to consider whether any changes are desirable in the contents and format. Proposals have been referred to certain authorities who are particularly interested in the Observatories Year Book, and discussion of the matter continues.

5. As reported at the meeting on 26th May, 1949, the Committee of the Meteorological Office, Edinburgh, met on 9th June. Among the matters discussed by the Committee were the following :-

/(a)

(a) The Cruickshank Research Lectureship at Aberdeen University

The question was raised as to the future of the Cruickshank Lectureship in Astronomy and Meteorology at Aberdeen University, which is at present vacant, and it was agreed that a letter should be sent to the Principal (Professor T.M. Taylor) to enquire whether it was intended to fill this appointment. A reply has been received from Professor Taylor stating that it has been decided to make a new appointment as soon as certain formalities have been completed.

(b) Representation of the Scottish Universities on the Committee

It was agreed that the present system whereby the four Universities were represented by two members nominated annually in rotation for a term of two years was unsatisfactory, and it was recommended that in future each University should be invited to nominate a representative to serve for such period as the University might wish. This reommendation has been agreed by the Chairman of the Meteorological Committee, and all four Scottish Universities will have their own representatives on the Edinburgh Committee.

6. The staffing position in the Meteorological Office still remains unsatisfactory. This is partly due to the continuation of resignations, and partly to the limited measure of success in recruiting new staff. The position regarding the Experimental Officer grades is gradually improving, but the shortage of Scientific Officers and Assistants still continues.

A scheme has been introduced for attaching University students to Government Departments during vacations. Applications for attachment to the Meteorological Office were received from 19 students from the following Universities :-

Manchester	8	Oxford	2	Cambridge	1	Birmingham	1
London	5	St. Andrews	2	Edinburgh	1	Sheffield	1

Owing to limited facilities it was necessary to restrict the number of students for attachment. Eight students were finally selected, two each from Manchester and London Universities, and one each from Oxford, Cambridge, Edinburgh and Birmingham Universtities.

7. On 29th July 1949 a new departure was made in metorological practice by the inclusion of weather charts in the B.B.C. Television Programmes. Special charts are prepared in a simplified form, the

first showing the existing situation with its associated weather, and the second indicating the corresponding information as forecast for the following day. The display of the two charts is accompanied by a verbal description and forecast. This is a regular feature of the evening television programme.

8. The existing three sections of the Daily Weather Report will be replaced by two publications as from 1st January, 1950 :-

(a) The Daily Weather Report, which will include most of the information at present given in the British Section and certain charts at present being published in the International Section. The latter will be discontinued.

(b) The Daily Aerological Record, which will replace the existing Upper Air Section, which has become much overcrowded. The number of pages will be increased from four to six to include full radio-sonde and radio-wind data for British stations, Valentia and the Ocean Weather Ships.

9. In connection with the Centenary of the Royal Meteorological Society in April 1950, the Meteorological Office is co-operating with the Society in arranging a metorological exhibition in the Science Museum, South Kensington.

The Office is also co-operating with the Director of Science for the Festival of Britain, 1951, in the preparation of an exhibit relating to meteorology and the upper atmosphere.

10. Sir Edward Appleton of Edinburgh University has asked the Director for the support of the Meteorological Office in submitting papers on geophysical subjects for a new "Journal of Atmospheric and Terrestrial Physics", of which he is Editor-in-Chief.

11. During recent visits to this country, Dr. T. Bergeron (Sweden) and Dr. J. Namias (U.S.A.) were invited to give lectures to the staff of the Meteorological Office. Dr. Bergeron lectured on "The problem of artifical control of rainfall over the globe" and Dr. Namias on "The basis for extended forecasting as practised in the U.S. Weather Bureau". The lectures were much appreciated.

/12.

12. A meeting of a Working Group of the Executive Council of the International Meteorological Organisation was held in Victory House from 10th to 27th October, 1949, to work out the detailed arrangements for the transfer of the International Meteorological Organisation to the World Meteorological Organisation. Up to the present the World Meteorological Convention has been ratified by 26 States.

13. Unless a reply is received from you, it will be assumed that you agree with the Chairman's suggestion contained in the opening paragraph of this letter.

Yours faithfully,

R J Williams

Secretary,
Meteorological Committee.

MINUTES

METEOROLOGICAL COMMITTEE

One Hundred and Sixty-Fifth Meeting, held in the Air Council Room, Air Ministry, King Charles Street, Whitehall, at 11 a.m. on 1st June, 1950.

PRESENT:-

Mr. Aidan Crawley, M.B.E., M.P. (Chairman)
Under Secretary of State for Air

Mr. W.J. Bigg (Colonial Office)
Commander P. Bracelin (Naval Weather Service, Admiralty)
Brigadier K.R. Brazier-Creagh (War Office)
Professor Sir David Brunt (British Universities)
Professor G.M.B. Dobson (Royal Society)
Mr. W.B. Foden (Air Ministry)
Professor W.M.H. Greaves (Royal Society of Edinburgh)
Sir Nelson Johnson (Director, Meteorological Office)
Air Commodore J.W.F. Merer (Air Ministry)
Captain J.H. Quick (Ministry of Transport)
Mr. J. Riley (Ministry of Civil Aviation)
Professor O.G. Sutton (Royal Society)
Mr. R.J. Williams (Secretary)

Apologies for absence were received from the following:-

Mr. H.M. Garner (Ministry of Supply)
Air Chief Marshal The Hon. Sir Ralph A. Cochrane, who was represented at the meeting by Air Commodore J.W.F. Merer.

1430. Membership.

The Chairman reported the following changes in the membership of the Committee:-

Professor Sydney Chapman, F.R.S., resigned after 18 years membership.
Professor O.G. Sutton, F.R.S., has been appointed to succeed Professor Chapman as a representative of the Royal Society.
Mr. H.M. Garner, C.B., has been nominated to succeed Sir Ben Lockspeiser as the representative of the Ministry of Supply.
Air Chief Marshal The Hon. Sir Ralph A. Cochrane, K.C.B., K.B.E., A.F.C., has succeeded Air Marshal Sir Hugh Walmsley as the representative of the Air Staff.
Mr. G.W. Stallibrass has been appointed to succeed Mr. W.E.B. Griffiths as the representative of the Ministry of Civil Aviation.

The Chairman referred to Professor Chapman's resignation and mentioned his long association with the Committee; he had been a member since 1932, and Vice-Chairman since 1946. The Chairman proposed and the Committee agreed that a letter of appreciation should be sent to Professor Chapman, thanking him for the valuable services he had rendered to the Meteorological Committee and the Meteorological Office.

The Chairman stated that it was necessary to elect a Vice-Chairman to succeed Professor Chapman. It was proposed by the Director and seconded by Sir David Brunt that Professor Dobson be elected Vice-Chairman, and this was agreed by the Committee.

The Chairman also reported that the Air Ministry had written to the Ministry of Fuel and Power regarding their representation on the Committee. A reply had been received stating that the matter had been carefully reconsidered, but it would not appear that representation of the Ministry of Fuel and Power on the Meteorological Committee would be justified at the present time.

/ 1431.

1431. The Minutes of the 164th Meeting held on 26th May, 1949, were confirmed.

1432. Arising out of Minute 1423

The Director reported that with regard to the question of resuming the publication of the Observatories' Year Book, it had been necessary to consider whether any changes were desirable in the contents and format of the publication. Since the last meeting the matter had been under discussion with the authorities and persons particularly interested in the data, but final agreement on the format had not yet been reached. It was hoped that this would not now be long delayed.

1433. Arising out of Minute 1424.

The Director asked whether H.M. Ships on the West Indies Station were now receiving adequate meteorological information in Bermuda. Commander Bracelin confirmed that satisfactory arrangements had been made and that the necessary meteorological information was supplied by the U.S.A. Weather Services.

1434. Annual Report of the Director of the Meteorological Office for the year April 1, 1949, to March 31, 1950.

The Committee considered the Annual Report of the Director for the year April 1, 1949, to March 31, 1950, which was submitted in galley proof. (M.C.-24).

Page 1. Gassiot Committee

The President of the Royal Meteorological Society should be added to the list of members of the Gassiot Committee.

Pages 2 and 3. AIRMET Broadcasting Service

The Director drew attention to the cessation of the AIRMET radio-telephone broadcasts on 15th March, 1950. A re-allocation of broadcasting frequencies had been made at the international conference held in Copenhagen, and owing to the many claims for frequencies within the broadcasting band it was found impossible to make provision for AIRMET broadcasts in this band.

The Chairman stated that discussions had been held with the British Broadcasting Corporation, the General Post Office and the Ministry of Civil Aviation to consider the question of restarting the AIRMET broadcasts. The possibility of sharing a wavelength with a continental station was being explored, and the outcome of these consultations was awaited.

The Chairman also stated that consideration was being given to the better use of broadcasting time in the general weather and shipping forecasts broadcast by the B.B.C. It had been suggested that a general inference for the whole country would be broadcast, and that each B.B.C. regional station would then broadcast a fuller forecast for its own particular region. The B.B.C. were considering the matter, which was entirely separate from AIRMET, to see if there were any technical difficulties in the proposal.

Sir David Brunt stressed the importance of making meteorological information available to the general public, and stated that the AIRMET broadcasts had been one of the greatest services rendered by the Meteorological Office. Professor Dobson considered that the AIRMET broadcasts should be modified to meet the needs of the general public as well as those of aviation.

Professor Greaves referred to the possibility of providing weather forecasts by automatic telephone. The Director stated that discussions on this matter had been taking place for some time with the General Post Office, but owing to the present great shortage of telephones, it had not been possible to proceed with the scheme. Technical details were, however, being worked out so that they would be available when the G.P.O. was ready to put the scheme into operation.

Air Commodore Merer stressed the need for special weather forecasts and information to meet the requirements of aviation. The Chairman stated that there would be no change in the information supplied for aviation purposes, and that the aviation aspect would be covered in the general forecasts.

Professor Dobson referred to the times at which the broadcasts are made and suggested that 9 p.m. would be more suitable than the present 5.55 p.m. He also suggested that the general and regional forecasts should be broadcast every four hours. The Director stated that these suggestions would be borne in mind in the discussions with the B.B.C.

After some further discussion the following resolution was adopted:-

> "The Meteorological Committee desires to place on record its views that AIRMET has in the past met an outstanding need among the general public, and has in fact been one of the greatest services rendered by the Meteorological Office to the general public.
>
> The Committee therefore urges that the AIRMET service should be reinstated, and modified to meet the needs of the general public, as well as aviation, and that the provision of this service be made as widely known as possible."

Page 3. (2) Supply of Forecasts for the General Public, Government Departments etc., (a) British Broadcasting Corporation

The Director drew attention to the daily broadcasts by television of meteorological charts and forecasts covering the London and south-east England area, which was instituted on 28th July, 1949. This broadcast was extended to the Midlands area when the television service from Birmingham was commenced.

Professor Sutton mentioned that the broadcasts would be more valuable if additional information could be included. The Director stated that it had been the intention to give more detailed information, but the B.B.C. did not wish to broadcast more advanced weather maps for the present.

Professor Greaves expressed his appreciation of the valuable forecasts which had been supplied by the Meteorological Office at Pitreavie to the Royal Observatory, Edinburgh, during the past year.

Page 3. (d) Meteorological Flights

Air Commodore Merer referred to the replacement of the Halifax aircraft which had been used for some time past by the meteorological reconnaissance flights by Hastings aircraft and stated that the delivery of the modified Hastings aircraft had been delayed and the date given in the Report should be amended to read June, 1950.

Page 3. (e) Radio-sonde and radio-wind stations

Air Commodore Merer enquired about the progress made towards the establishment of radio-sonde stations in various parts of the world. The Director stated that steps had been taken to induce the authorities concerned to establish radio-sonde stations at Singapore and Khartoum at an early date. Arrangements were also being made by the Director of the Ceylon Meteorological Service for the establishment of a radio-sonde station at Colombo. The Meteorological Office had given every assistance to the services concerned, and it was hoped that all these radio-sonde stations would be established in the near future.

/ Page 4

Page 4. (3) Services for the Royal Air Force. (b) Organisation

Air Commodore Merer stated that the Royal Air Force in the Middle East Area was known as the Middle East Air Force and the last two lines of the second paragraph of this section should be amended accordingly.

Air Commodore Merer also referred to the TALK-TO-MET facilities provided for the benefit of R.A.F. aircraft in transit and enquired about the difficulties of operating the radio-telephone links between Malta, Ismailia and Habbaniya.

Page 6. (9) Services for the Dominions, Colonies, etc. (e) Falkland Islands

The Director referred to the transfer on 1st January, 1950, of the forecast office at Port Stanley to the administration of the Governor to become part of the newly formed Meteorological Service of the Falkland Islands and Dependencies. This office had hitherto been administered by the Meteorological Office. The radio-sonde unit will, however, remain the responsibility of the Meteorological Office.

Page 7. (1) British Climatology. (e) Special Work

The Director drew attention to the progress made towards the publication of the Climatological Atlas of the British Isles. Preparatory work on the Atlas had been carried out for some years. The Atlas will consist of about 19 pages of text and some 92 plates together with two diagrams in the text.

The Director also referred to the work done by the Climatological Branch in connection with various Committees concerned with hydrology and water supply. At present responsibility for rainfall records rested with the Meteorological Office, but run-off data were dealt with by a variety of bodies. In view of the increasing importance of water to the country, the Meteorological Office was endeavouring to act as a co-ordinating centre for all aspects of water supply. The Committee strongly supported this action by the Meteorological Office, Sir David Brunt and Professor Greaves both quoting recent cases in which difficulties had arisen from the absence of any such central co-ordinating department.

Page 9. (5) Upper Air Statistics. (a) Collection of Observations

The Director drew attention to the progress that has been made for collecting and summarising upper air observations and to the increase in the number of stations for which upper air data are available. This data will prove of value in connection with research into conditions in the uper atmosphere, in addition to its immediate operational value.

Page 9. (1) Co-ordination of Research. (c) Collaboration with the Royal Society

The Director referred to the work being done by the Gassiot Committee and mentioned that the grant now being made by the Air Ministry to the Royal Society in connection with long term fundamental investigations in atmospheric physics will cease at the end of the current year. If the Gassiot Committee intends to apply for a renewal of the grant, it will be necessary to take early steps to obtain financial approval. Sir David Brunt said this question would be considered at a meeting of the Gassiot Committee to be held on 12th June.

Sir David Brunt and Professor Dobson emphasised the importance of the fundamental investigations undertaken under the guidance of the Gassiot Committee, and it was agreed that the paragraph dealing with the work of the Gassiot Committee should be expanded to indicate that, while definite progress had been made, the work is a long way from reaching finality.

The Director expressed his appreciation of the help received from the Gassiot Committee and the Royal Society.

Sir David Brunt also stated that the Royal Society had appointed the President of the Royal Meteorological Society to be an ex-officio member of the Gassiot Committee, and that the list of members given in page 1 of the galley proof should be amended accordingly.

Page 10. (2) Instrument Development. (a) General Instruments.

The Director mentioned the installation at Farnborough of an instrument for determining the slant visibility up to 200 feet at night by measuring the light scattered from a searchlight beam. This instrument had been developed primarily to meet the needs of aviation. There was a definite need for an instrument which would express the visibility at night in units which would meet the requirements of pilots. As an alternative approach to this problem a start had been made on the development of instruments for measuring the height of the top of a fog layer with the aid of a tethered balloon.

Page 10. (2) Instrument Development. (c) Radio-sonde and radio-wind instruments

The Director drew attention to the development of experimental sounding balloons of an improved type which enabled some very successful combined radio-sonde and radio-wind ascents to be made. Observations of temperature and wind up to heights of about 100,000 feet had been obtained. The experiments are being continued.

Page 10. (3) Forecasting Research

The Director referred to the provision of a new building - the "Napier Shaw Laboratory" - to accommodate the Forecasting Research Division at the Central Forecasting Office at Dunstable.

Professor Dobson mentioned the more important forecasting research problems which had been carried out during the year, and emphasised the importance of these investigations for day to day forecasting.

Page 11. (4) Research in Physical Meteorology. (iv) Meteorological Research Flight.

Air Commodore Merer and Professor Dobson referred to the value of the work of the Meteorological Research Flight.

Professor Sutton suggested that the wording of sub-para. 4 of this section should be amended by the deletion of the words "and to the design of an aircraft thermometer in which correction for aircraft speed will be automatically compensated". This was agreed by the Committee.

Page 11. (5) Work of the Observatories and Geophysical Research. (b) Edinburgh Meteorological Office

The Director mentioned that the Meteorological Office, Edinburgh, was due to move in the very near future to new premises at 26, Palmerston Place, but the actual date had not yet finally been fixed.

Page 12. 5. Organisation. (2) Staff

The Director reported on the general staffing position in the Meteorological Office. There had been a steady increase in strengths in the Experimental Officer and Assistant (Scientific) classes since the last meeting. By the end of the year assistants in training slightly exceeded the number of vacant posts, but the replacement of assistants resulted in a continual movement of staff at units, and imposed a handicap on efficiency which was increased by the fact that the replacements were relatively inexperienced. The establishments which had been drawn up at the end of the Second World War were in the process of being revised in order to bring them into closer accord with present day requirements.

/ Page. 13.

Page 13. Courses for Air Observers

The Director referred to the provision of observers for making meteorological observations from meteorological reconnaissance aircraft. The Meteorological Air Observer Section of the Royal Air Force which had been instituted during the war had been abolished, but was now to be re-established and staffed by volunteers from the Meteorological Office.

Page 15. 6. International Co-operation. (1) International Meteorological Organisation.

The Director referred to the omission of a reference to the meeting of Regional Commission VI (Europe) held in London during the week 27th June to 2nd July, 1949, and stated that a suitable reference would be added to the galley proof.

Sir David Brunt enquired about the present position concerning the World Meteorological Organisation. The Director gave a brief account of the present position and stated that up to date the World Meteorological Convention had been ratified by 33 States. In the meantime, the work of the International Meteorological Organisation was being carried out on a caretaking basis. It had been arranged to hold the first W.M.O. Congress in Paris in March next year, which would be preceded by a Conference of Directors of the I.M.O., at which arrangements for the tranfer of the International Meteorological Organisation to the World Meteorological Organisation would be finally settled.

The Committee accepted the Annual Report of the Director for the year April 1, 1949, to March 31, 1950, subject to the amendments mentioned above and a few editorial corrections.

1435. Annual Report of the Director of the Naval Meteorological Service, April 1, 1949, to March 31, 1950.

The Chairman drew the attention of the Committee to the Annual Report of the Director of the Naval Meteorological Service for the year 1st April, 1949, to 31st March, 1950. (M.C.-25).

Commander Bracelin referred briefly to the more important items in the Report.

On 1st April, 1950, the Naval Meteorological Service was re-constituted as an independent Admiralty Department under the supervision of the Vice-Chief of the Naval Staff. The new department will be called the Naval Weather Service Department. (N.W.S.D.) and the Director will be known as the Director of the Naval Weather Service (D.N.W.S.).

Approval had been given for the provision of a meteorological teleprinter system linking all Naval Air Stations in the Home Command.

As part of the reduction of Naval Establishments to effect economy, the Fleet Weather Centre at Trincomalee was closed on 6th November, 1949, and meteorological information for the Fleet on the East Indies Station was being supplied by the Meteorological Office station at Negombo, the Indian Meteorological Department and the East African Meteorological Service.

The future of the Fleet Weather Centre at Simonstown was at present under consideration.

The Director referred to the functions of the Naval Weather Service given in the Report and stated that the Air Ministry had raised certain objections with the Admiralty. The functions as now given do not entirely agree with the provisions of a recent agreement about the division of responsibility between the Air Ministry and the Admiralty for meteorological matters. They might be interpreted to mean that the Naval Weather Service has rather wider functions than those laid down in the agreement, and this might lead to difficulties. The Admiralty had, therefore, been asked to consider amending the functions to ensure that they cannot be interpreted differently from the agreement.

The Chairman thanked the Director of the Naval Weather Service for his Annual Report, which was noted by the Committee.

1436. Meteorological Research - Annual Report of the Meteorological Research Committee to the Secretary of State for Air for the year ended 31st March, 1950.

The Chairman referred to the Annual Report of the Meteorological Research Committee for the year ended 31st March, 1950 (M.C.-26) which had been submitted to the Secretary of State for Air.

Professor Dobson (Chairman of the Meteorological Research Committee) referred to the more important researches which had been under consideration, and in particular to the new techniques which had been devised for tackling problems connected with short range forecasting.

Professor Dobson drew the attention of the Committee to the success of the arrangements made last year for the attachment of a number of university students to research establishments of the Meteorological Office during the summer vacation. The Meteorological Research Committee greatly regretted the Treasury decision to curtail the number of students for attachment this year. Professor Dobson stressed the importance of the scheme in stimulating recruitment of scientific officers, as it afforded a most valuable form of recruiting propaganda by acquainting university students with the nature of the work carried out by the Meteorological Office. The cost of the scheme was trivial, and he suggested that representations should be made to the Treasury regarding the importance and usefulness of the scheme.

Mr. Foden explained that the Treasury decision was made on the grounds of economy and affected all Government Departments. The Air Ministry had made strong representations against any curtailment of the scheme. The Treasury were fully aware of the value which Departments and Universities attached to the scheme.

After further discussion the Committee formally recorded its regret to learn that the Treasury were curtailing the scheme this year, in view of the trivial cost of the scheme and it was agreed that a memorandum of protest should be submitted to the Treasury. It was also agreed that this matter be given prominence in the Committee's Annual Report to the Secretary of State.

The Committee noted the Report of the Meteorological Research Committee.

1437. Annual Report of the Meteorological Committee to the Secretary of State for Air for the year ended 30th June, 1950.

The Chairman referred to the draft of the Annual Report of the Meteorological Committee to the Secretary of State for Air for the year 1st July, 1949, to 30th June, 1950. (M.C.-27).

The Committee approved the draft Annual Report.

1438. International Meetings

The Committee noted the international activities of the Meteorological Office as shown in a paper M.C.-28. (See Min. 1434 above regarding the omission of a reference to the meeting of Regional Commission VI in London, June-July, 1949).

/ 1439.

1439. Date of Next Meeting

The Chairman suggested that the date of the next meeting should be left open, and this was agreed. In this connection the Chairman requested the Committee's views on the practice of issuing a circular letter containing matters of interest to members in place of the autumn meeting when there were not sufficient matters which could profitably be discussed at a formal meeting. The Committee agreed that the practice should continue, provided that there were no matters of sufficient importance to warrant discussion by a formal meeting.

1440. The Committee rose at 12.35 p.

M.C. - 24

METEOROLOGICAL COMMITTEE

Annual Report
of the Director of the
Meteorological Office
presented by the Meteorological Committee
to the Secretary of State for Air
for the year
April 1st 1949, to March 31st 1950.

The Annual Report which was previously circulated in proof stage was accepted, subject to amendments, by the Committee - see Minute 1434.

M.C. - 25

METEOROLOGICAL COMMITTEE

Annual Report of the Director
of the Naval Meteorological Service
1st April 1949, - 31st March 1950.

The Annual Report of the Director of the Naval Meteorological Service which was previously circulated was noted by the Committee - see Minute 1435.

M.C. - 26

METEOROLOGICAL COMMITTEE

Report of the Meteorological Research Committee
to the
Secretary of State for Air
for the year ended 31st March 1950.

The Report of the Meteorological Research Committee (M.R.P. 543) which was previously circulated, was noted by the Committee - see Minute 1436.

METEOROLOGICAL COMMITTEE

AIR MINISTRY

ANNUAL REPORT OF THE METEOROLOGICAL COMMITTEE TO THE SECRETARY OF STATE FOR AIR FOR THE PERIOD 1ST JULY, 1949, TO 30TH JUNE, 1950

1. The Meteorological Committee met on 1st June, 1950. As in the previous year the formal meeting due to be held in November was not convened as there were no matters of sufficient importance to justify a meeting. Matters which it was necessary to bring to the attention of the Committee were communicated by letter.

2. Membership.

Professor Sydney Chapman, F.R.S., resigned after 18 years membership.

Professor O.G. Sutton, C.B.E., F.R.S., has been appointed to succeed Professor Chapman as the representative of the Royal Society.

Mr. H.M. Garner, C.B., has been nominated to succeed Sir Ben Lockspeiser as the representative of the Ministry of Supply.

Air Chief Marshal The Hon. Sir Ralph A. Cochrane, K.C.B., K.B.E., A.F.C., has succeeded Air Marshal Sir Hugh Walmsley as the representative of the Air Staff.

Mr. G.W. Stallibrass has been appointed to succeed Mr. W.E.B. Griffiths as the representative of the Ministry of Civil Aviation.

The Committee noted Professor Chapman's long association with the Meteorological Office. He was appointed a member of the Committee in 1932, and had acted as Vice-Chairman since 1946. Professor Chapman has agreed to continue as a scientist member on the Meteorological Research Committee.

3. Staffing of the Meteorological Office.

Although the staffing position in the Meteorological Office cannot yet be regarded as satisfactory, the situation is appreciably better than a year ago. The improvement is mainly due to the increase in the strength of the Experimental Officer and Assistant classes. The difficulty of obtaining Scientific Officers continues, but the Committee approves the policy which is being pursued of restricting recruitment of Scientific Officers to candidates of a really high standard of scientific ability. The Committee is also glad to note that it is proposed to transfer staff of the Scientific Officer class to research and other scientific duties, leaving routine forecasting to be performed as far as possible by the Experimental Officer class.

4. Vacation Students.

The Treasury scheme whereby vacation students are attached to research establishments in Government Departments was adopted last year by the Meteorological Office. For the summer vacation, eight students were selected, two each from Manchester and London Universities, and one each from Oxford, Cambridge, Edinburgh and Birmingham Universities. The scheme affords a most valuable form of recruiting propaganda by acquainting University students with the nature of the work carried out in the Meteorological Office. The cost of the scheme is trivial, and the Meteorological Committee therefore regrets to learn that the Treasury are curtailing the scheme this year on the grounds of economy.

5. Report of the Director of the Meteorological Office.

The Committee received the Report of the Director of the Meteorological Office for the year 1st April, 1949, to 31st March, 1950, and presented it (after amendment) to the Secretary of State for Air.

/6.

6. Report of the Director of the Naval Meteorological Service.

The Committee received and took note of an abridged Report of the Director of the Naval Meteorological Service, Admiralty, for the year 1st April, 1949, to 31st March, 1950.

7. Airmet Broadcast.

The Meteorological Committee has been concerned at the cessation of the Airmet broadcasts on 15th March, 1950, and adopted the following resolution at their meeting on 1st June:-

> "The Meteorological Committee desires to place on record its views that Airmet has in the past met an outstanding need among the general public, and has in fact been one of the greatest services rendered by the Meteorological Office to the general public.
>
> The Committee therefore urges that the Airmet service should be reinstated, and modified to meet the needs of the general public, as well as aviation, and that the provision of this service be made as widely known as possible."

8. Meteorological Research.

The Committee noted the Report of the Meteorological Research Committee for the year ended 31st March, 1950. Owing to the shortage of scientific and technical staff, the authorised complement of staff for research has not yet been attained. However, the research done by the officers engaged on investigations was of a high standard. The Committee note the progress which has been made in the study of conditions in the stratosphere, the exploration of gustiness and ice-accretion in cumulo-nimbus clouds and the examination of very strong winds (circa 200 m.p.h.) which occur in the upper atmosphere.

A new building - the Napier Shaw Laboratory - has been erected at the Central Forecasting Office, Dunstable, to provide improved accommodation and facilities for staff engaged in synoptic and dynamical research in relation to weather forecasting.

9. Geophysical Observations.

Some members of the Committee have expressed concern at the delay in resuming publication of the Observatories' Year Book, issue of which ceased during the war. To facilitate the clearing off of the arrears of unpublished observations, plans have been drawn up for abbreviating the data to be included in the volume for the period in question. A solution satisfactory to the many scientific workers and international interests concerned has not yet been found.

10. International Meteorology.

The Committee noted the continued activities of the Meteorological Office in the field of international meteorology.

11. Exhibitions.

In connection with the Centenary celebrations of the Royal Meteorological Society in April, 1950, the Meteorological Office co-operated with the Society and the Director of the Science Museum in arranging a meteorological exhibition in the Science Museum, South Kensington.

The Office is also co-operating with the Director of Science for the Festival of Britain, 1951, in the preparation of an exhibit relating to meteorology and the upper atmosphere.

The Committee is of opinion that co-operation in exhibitions of this kind cannot fail to assist in educating the public in a proper understanding of the functions and capabilities of the State Meteorological Service.

AIDAN CRAWLEY

Chairman.

19th July, 1950.

M.C. - 28

METEOROLOGICAL COMMITTEE

AIR MINISTRY

INTERNATIONAL MEETINGS (June, 1949 to May, 1950)

1. INTERNATIONAL METEOROLOGICAL ORGANISATION

(a) Executive Council, held in Lausanne, 5th to 13th July, 1949, and 1st to 20th May, 1950, attended by:-

The Director (President)

(b) Sub-Committee for the Study of Clouds and Hydrometeors, held in Paris, 21st August to 2nd September, 1949, attended by:-

Mr. C.K.M. Douglas

(c) Meeting of Working Group of the Executive Council for discussions of detailed arrangements for the transfer of the functions of the International Meteorological Organisation to the World Meteorological Organisation, held in London, 10th to 27th October, 1949, attended by:-

The Director (President)

(d) Joint Meeting of the Commission for Aeronautical Meteorology (I.M.O.) and the Meteorology Division of the International Civil Aviation Organisation, held in Paris, 18th February to 26th March, 1950, attended by:-

Mr. J. Durward
Mr. W.H. Bigg
Mr. E. Chambers

(e) Comparative Trials of various national designs of radio-sondes held at Payerne, Switzerland, during May, 1950, attended by:-

Dr. D.N. Harrison
Mr. H.E. Painter

2. INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS

(a) Meeting of International Council of Scientific Unions held at Copenhagen, 9th to 17th September, 1949, attended by:-

Dr. J.M. Stagg (representing the International Union of Geodesy and Geophysics).

(b) Meeting of the Organising Committee for the Brussels Assembly 1951, held at Brussels, 15th to 16th March, 1950, attended by:-

Dr. J.M. Stagg (General Secretary of the Union).

N.K. JOHNSON
Director

Meteorological Office,
Air Ministry, London, W.C.2.
May, 1950.

G.256864/JMB/5/50/50

IMPORTANT

All communications must be addressed to THE DIRECTOR

In reply to this letter quote
A.968486/48/D.M.O.

Telegrams :—"WEATHER TELEX LONDON"
Telephone :—HOLBORN 3434
Extension

METEOROLOGICAL OFFICE
AIR MINISTRY
KINGSWAY
LONDON, W.C.2

20 December, 1950.

Dear Sir,

The Committee agreed at their last meeting (Minute 1439) to continue the practice of issuing a circular letter containing matters of interest to members in place of the autumn meeting, provided that there were no matters of sufficient importance to need discussion at a formal meeting. No such questions have arisen since the last meeting, and the Chairman has therefore instructed me to inform you that, unless members particularly wish him to call a meeting, he proposes to consider the information contained in this letter as officially communicated to members and as taking the place of this year's autumn meeting.

2. The Annual Report of the Meteorological Committee for the year 1st July, 1949, to 30th June, 1950, was submitted to the Secretary of State for Air on 19th July, 1950.

3. Since the last meeting of the Committee discussions have continued with the B.B.C. on the better use of broadcasting time, and particularly the question of broadcasting regional weather forecasts by each B.B.C. Region. It has been agreed that as from 19th November, 1950, each B.B.C. Regional Station will broadcast at 5.55 p.m. its own regional weather forecasts. The order of the details will be (a) gale warnings; (b) shipping forecast; (c) general forecast and outlook; and (d) regional forecast. The information under (a), (b) and (c) will be the same for all Regions, and will be prepared by the Central Forecasting Office. The regional forecasts are prepared by the Central Forecasting Office in consultation with selected meteorological offices in the regions concerned as follows:-

London Region (including whole of S.E. England and most of East Anglia)	Central Forecasting Office, Dunstable.
Midland Region	Watnall.
North Region	Preston.
West of England Region	Plymouth.
Scotland Region	Prestwick.
Northern Ireland Region	Aldergrove.
Wales Region	Gloucester.

The B.B.C. are at present, owing to various causes, unable to extend the regional weather forecasts to the morning and midday broadcasts. The forecasts broadcasted at 6.55 a.m., 7.55 a.m. and 12.55 p.m. will therefore remain for the time being as they are at present.

4. The Advisory Committee on Meteorology for Scotland met on 15th June. The Committee noted with interest the increased attention being given to agricultural meteorology in Scotland. In this connection the Director arranged for the Head of the Agricultural Branch of the Meteorological Office (M.O.19) to visit Scotland and discuss with the agricultural authorities the assistance which the Meteorological Office could give to agricultural advisory and research organisations. It now appears that Scotland needs a service similar to that which is provided by the Meteorological Office in England and Wales.

The Committee also stressed the importance of providing a meteorological exhibit at agricultural shows in Scotland, and it was hoped that space could be found for one at the Royal Highland Show.

/ 5.

G.278484/JDG/12/50/75

5. The general staffing position in the Meteorological Office has improved. The increase in strengths in the Experimental Officer and Assistant (Scientific) classes reported at the last meeting has been maintained, but the continued high rate of resignation of Assistants (Scientific) involves frequent replacement of trained Assistants by comparatively inexperienced staff. Six new Scientific Officers have been appointed this summer.

6. It was reported at the last meeting that the Treasury were curtailing in 1950 the scheme for the attachment of vacation students to Government Departments and in accordance with the wishes of the Committee a letter of protest was sent to the Treasury. It has now been decided that the scheme for vacation students will be continued in future years on a permanent basis, and the Treasury have been informed that up to twelve students per annum are desired for the Meteorological Office.

It may be of interest to members to have the following details about the attachment of students to the Meteorological Office during the last summer's long vaction. Applications were received from 31 students from the following Universities:-

Bristol	4	Durham	2
London (King's College)	4	London (Imperial College of Science and Technology)	1
Birmingham	3	Cambridge (St. John's College)	1
Manchester	3	Cambridge (Sidney Sussex College)	1
London (Queen Mary College)	2	Cambridge (Newnham College)	1
London (University College)	2	Exeter	1
Nottingham	2	Leeds	1
Southampton	2	Aberystwyth	1

Owing to the limited number of places allotted to the Meteorological Office only eight students could be taken viz: two from Birmingham University and one each from King's College, Queen Mary College, Imperial College of Science and Technology, London, St. John's College, Cambridge and Bristol and Leeds Universities.

7. The Director mentioned at the last meeting that the grant now being made by the Air Ministry to the Royal Society in connection with long term fundamental investigations in atmospheric physics would expire on 31st March, 1951. As a result of recommendations made by the Royal Society, the Treasury have agreed to an extension of the grant for a further period of five years as from 1st April, 1951. At the same time approval was given for the total grant to be increased from £20,000 to £25,000.

8. Members of the staff of the Meteorological Office have attended the following meetings called by the International Civil Aviation Organisation:-

(a) Middle East Regional Air Navigation Meeting held in Istanbul, 17th October to 6th November, 1950, attended by:-

Mr. W.H. Bigg Mr. M.J. Thomas.

(b) A special meteorological meeting of the Africa-Indian Ocean, European-Mediterranean and North Atlantic Regions, held in Paris, 8th November to 6th December, 1950, attended by:-

Mr. J. Durward Mr. G.J.W. Oddie.

9. Unless a reply is received from you, it will be assumed that you agree to the Chairman's suggestion contained in the opening paragraph of this letter.

Yours faithfully,

R.J. Williams

(R.J. WILLIAMS)
Secretary
Meteorological Committee

G.278484/JDG/12/50/75

MINUTES

METEOROLOGICAL COMMITTEE

One Hundred and Sixty-sixth Meeting, held in the Air Council Room, Air Ministry, King Charles Street, Whitehall, at 11 a.m. on 31st May, 1951.

PRESENT:-

Mr. Aidan Crawley, M.B.E., M.P. (Chairman)
Under Secretary of State for Air

Mr. H. de Belleroche (Ministry of Civil Aviation)
Mr. W.J. Bigg (Colonial Office)
Instructor Captain F. Bracelin (Naval Weather Service, Admiralty)
Professor Sir David Brunt (British Universities)
Professor G.M.B. Dobson (Royal Society)
Captain J. Estill (Ministry of Transport)
Mr. W.B. Foden (Air Ministry)
Sir Harry Garner (Ministry of Supply)
Professor W.M.H. Greaves (Royal Society of Edinburgh)
Sir Nelson Johnson (Director, Meteorological Office)
Air Commodore J.W.F. Merer (Air Ministry)
Major P.C. Reynolds (War Office)
Mr. R.J. Williams (Secretary)

Apologies for absence were received from the following:-

Sir Edward Salisbury (Ministry of Agriculture and Fisheries)
Professor O.G. Sutton (Royal Society)
Captain J.H. Quick (Ministry of Transport), who was represented at the meeting by Captain J. Estill.

1441. Membership.

The Chairman reported the following changes in the membership of the Committee:-

Captain R.F. Nichols, R.N., has succeeded Captain F.M. Walton, R.N., as Director of the Naval Weather Service, Admiralty.
Major General K.F. MacK. Lewis, C.B., D.S.O., M.C., has succeeded Major General S.B. Rawlins, C.B., C.B.E., D.S.O., M.C., as Director of Royal Artillery, War Office.

1442. The Minutes of the 165th Meeting held on 1st June, 1950, were confirmed.

1443. Action arising out of the 165th Meeting.

The Director reported that action had been taken on questions arising from the 165th Meeting. With regard to AIRMET, the Chairman stated that efforts to obtain an allocation of a broadcasting frequency for the AIRMET service had so far proved unsuccessful despite prolonged examination of the problem. Further efforts will continue to be made for the restoration of the AIRMET broadcasts. (See also Minute 1444).

The Director reported that approval had recently been given for the formation of a new branch (M.O.23) to deal solely with upper air statistics. He also drew attention to the Treasury decision to continue the scheme for vacation students on a more liberal basis in future as reported in the circular letter which was sent to members on 20th December, 1950.

/ 1444.

1444. Annual Report of the Director of the Meteorological Office for the year April 1, 1950, to March 31, 1951.

The Chairman asked the Committee to consider the Annual Report of the Director of the Meteorological Office for the year April 1, 1950, to March 31, 1951 (M.C.-29). The Director regretted that owing to printing delays it was not possible to circulate the complete galley proof of the Annual Report before the meeting. Ten galley pages had been circulated and the remaining pages were available to members at the meeting. He suggested that members of the Committee should inform him not later than 15th June of any comments they had to offer on the pages of the galley proof circulated at the meeting after they had opportunity to study them.

Page 3. Meteorological Committee

The list of members of the Meteorological Committee should be amended as follows:-

After "Major General S.B. Rawlins, C.B., C.B.E., D.S.O., M.C. (War Office)" add "(to December 15, 1950)".

Insert "Major General K.F. MacK. Lewis, C.B., D.S.O., M.C., (War Office) (from December 15, 1950)".

Galley 1. Functions of the Meteorological Office.

The Director proposed and the Committee agreed that the first four lines of the fourth paragraph of this section should be amended to read as follows:-

> "The Meteorological Office takes a leading part in international co-operation in meteorology. The Director of the Meteorological Office was the President of the International Meteorological Organisation and President of the World Meteorological Organisation for its first Congress. (See § 6, page ......).
>
> Other international organisations in the activities of which the Meteorological Office participates are the ....".

Galley 1. Sub-section (a) Central Forecasting Office.

Para.4, line 4. After "at" insert "British".

Para.5. It was felt that the wording implied that errors in the 24-hour forecasts issued by the Central Forecasting Office occur more frequently than in fact is the case, and it was agreed that the Director should amend the wording accordingly.

Galley 2. Para. 7, lines 3 and 6.

Air Commodore Merer pointed out that the desigination "air/sea rescue" had now been changed to "search and rescue". It was agreed to amend the wording accordingly in both cases.

Galley 2. Sub-section (d) Meteorological Flights.

Air Commodore Merer referred to the meteorological reconnaissance flights made from Gibraltar and stated that these flights were discontinued in March. It was agreed that a statement to this effect should be added to the first paragraph of this sub-section. It was also agreed that the words "throughout the year" should be deleted in line 1 of the second paragraph.

Galley 3. Radio communications

The Committee considered the first two paragraphs of this section, and after discussion it was agreed that the reference to "A" and "B" stations in the G.F.A. W/T broadcast given in the first paragraph (lines 5 - 8) should be deleted and that the first four lines of the second paragraph relating to the reception of the more distant broadcasts should be re-written. These lines have been re-cast as follows:-

> "In an attempt to collect as much data as possible for the construction of Northern Hemisphere charts, a number of changes have been made in the programme of reception of the more distant meteorological broadcasts."

The Chairman referred to the efforts made since the last meeting for the restoration of the AIRMET broadcasts (see also Minute 1443). These efforts have proved unsuccessful so far. Professor Brunt again stressed the importance of this service which met an outstanding need among the general public, and which has in fact been one of the greatest services provided by the Meteorological Office. The Committee agreed that the possibility should be examined of obtaining a broadcasting frequency for AIRMET broadcasts at the Extraordinary Meeting of the International Telecommunications Union which is due to be held in August this year.

The following amendment in the second line of the fifth paragraph of this section relating to AIRMET broadcasts was also agreed:-

Delete "failed for the time being" and substitute "proved unsuccessful so far".

Galley 3. Section (2), Supply of Forecasts for the General Public, Government Departments, etc. (i) Agriculture and Horticulture.

The Committee considered that the paragraph relating to notifications of fine spells should be deleted from the Report.

Galley 4. Section (3). Services to the Royal Air Force.

Air Commodore Merer referred to references to certain services provided by the Meteorological Office for the Royal Air Force, and considered that these references should be deleted from the Report on security grounds. The Director agreed that the references were not suitable for inclusion in the Report. The Chairman proposed and the Committee agreed that the Report should be referred to the Deputy Director of Intelligence (Organisation and Security) for examination.

Mr. Bigg referred to the meteorological services provided in some mandated territories and suggested that the actual territories should be named in the Report.

Sub-section (a), para. 4, line 2.

Delete "some of the mandated territories" and substitute:- "Libya and Eritrea".

Sub-section (b), para. 1.

Line 2.

Delete "AERO-TAFOT broadcasts" and substitute "broadcasts of weather reports and landing forecasts".

Delete "to be made".

Line 6.

After "facilities" add "whereby meteorological information is supplied direct to overflying aircraft by R/T".

Sub-section (b), paras. 2- 4.

Delete these three paragraphs.

Sub-section (b), para. 5, lines 1 - 2.

Delete "and of the inadequacy of the existing network" and substitute "and the limited number".

Sub-section (c).

Lines 2 - 3. Delete "planning" in both places.

Line 2. For "Committee" read "Sub-committee".

Sub-section (d), para. 3, line 2.

Delete "at Benson".

Sub-section (f).

Delete the whole of this sub-section.

Galley 4. Section (4) Services for Civil Aviation.

Mr. Belleroche referred to the services provided for Civil Aviation, and proposed the following amendments which were agreed by the Committee:-

Sub-section (a) para. 3, line 3.

After "Prestwick" add "for the north-west area".

Sub-section (b) para. 2.

Add at the end of the paragraph "by London Airport".

Galley 5. Sub-section (c) Services provided in the United Kingdom for Internal and European routes.

The Committee discussed the third paragraph of this sub-section and considered that the paragraph should be deleted.

Galley 5. Sub-section (f) Special work.

The Director referred to the last paragraph of this sub-section about the report of the Committee appointed to review meteorological arrangements for civil aviation. He proposed and the Committee agreed that the last three lines of this paragraph should be amended to read as follows:-

> "The report of this Committee states that it found nothing fundamentally wrong with the existing system. Indeed, it found among the representatives of the Corporations and of the Pilots' Associations a sincere respect for the Meteorological Service of this country and a general confidence in the accuracy of its forecasts."

The report also contained a number of recommendations on points of minor character, most of which have been adopted."

Galley 5. Section (5) Services for the Navy.

Instructor Captain Bracelin referred to the services provided for the Royal Navy and proposed that the last paragraph of this section relating to the training of naval personnel at Changi (Singapore) should be deleted. The Committee agreed and also considered that the whole section should be agreed with the Director of the Naval Weather Service.

Galley 5. Section (6) Services for the Army.

Major Reynolds spoke about the services provided for the Army, and asked for changes to be made in regard to certain statements which occurred in this section. The Committee agreed the proposed amendments, which are as follows:-

Para. 1, line 2.

Delete "and sound ranging".

Para. 1, line 4.

After "Camps" insert a comma.

Para. 1, line 7.

Delete "Army formations" and substitute "the Army".

Para. 4.

Delete the whole paragraph.

Galley 5. Section (7) Services for the Ministry of Supply

The Committee agreed the deletion of the second paragraph of this section.

Galley 6. Section (8) Services for the Merchant Navy and the Fishing Fleets.

Captain Estill proposed the following amendment to this section, which was agreed by the Committee:-

Para. 1, lines 9 - 10.

Delete "Board of Trade (Coastguard Division)" and substitute "Ministry of Transport (through the Coastguard services)".

Galley 6. Section (9) Services for the Dominions, Colonies, etc.

Mr. Bigg proposed and the Committee agreed that the heading of this section should read "Services for the Commonwealth". He also suggested that the inclusion of Pakistan in this section should be agreed with the Commonwealth Relations Office.

Sub-section (b) Malaya, Para. 2, line 2.

Major Reynolds proposed and the Committee agreed that the words "No. 3. Mark II" should be deleted.

/ Sub-section (b)

Sub-section (b) Hong Kong. Para. 2.

Air Commodore Merer asked that this paragraph should be deleted. The Committee agreed.

Sub-section (d) Falkland Islands.

Mr. Bigg proposed and the Committee agreed that "the Meteorological Office" should be substituted for "United Kingdom" in the first line.

Galley 7. Iraq. Para. 1, line 2.

The Committee agreed Air Commodore Merer's suggestion that the words "primarily to meet the requirements of the R.A.F." should be deleted from this paragraph.

Galley 7. Sub-section (d) Publications.

Para. 2. It was agreed to delete the reference to "Weekly Weather Report".

Para. 3. The Director referred to the publication of the Observatories' Year Book for the years 1938 onwards. Mr. Foden reported that the question of resuming the printing of the Observatories' Year Book had been referred to H.M. Stationery Office, but the Stationery Office had stated they could not accept the printing of this publication without Treasury approval.

Professor Greaves and Professor Dobson emphasised the importance of publishing the results of geophysical observations. Professor Greaves also suggested that the National Committee for Geodesy and Geophysics should be asked to express its views on the value of publishing the results of British geophysical observations. The Chairman proposed and the Committee agreed that the matter should be referred by the Director to the National Committee for Geodesy and Geophysics.

The Committee also agreed that the wording of the paragraph about the Observatories' Year Book should be amended as follows:-

Delete "the outbreak of war" and substitute "the volume for 1937".

Galley 8. Section (2) World Climatology (a) Overseas Stations.

Mr. Bigg stated that the Colonial Blue Books were no longer published. References to Colonial Blue Books should therefore be omitted. The Chairman proposed that the Director should agree with Mr. Bigg the re-wording of this paragraph. The following revised paragraph has been agreed:-

> "The collection of meteorological summaries from the Colonial territories was continued. Annual summaries from manuscript returns for 1939 to 1947 for six stations were manifolded for issue with other Colonial printed returns for those areas. Some progress was made in the preparation of the "Notes". Copies of prints of meteorological summaries were received from six colonies for 1948 and from nine for 1949."

Galley 9. Section (4) Agricultural Meteorology. (c) Inquiries.

The Committee agreed to the deletion of the reference to "the laying of underground cables", in lines 5 - 6 of this sub-section.

Galley 10. Section 4. Research and Development.

Professor Dobson referred to the work done by the Meteorological Research Committee. (See also Minute 1446). He stressed the importance of recruiting suitable men for meteorological research, and spoke of the difficulty of obtaining such personnel. Mr. Foden confirmed that difficulty was being experienced, but this was general throughout the Service. Professor Dobson proposed and the Committee agreed that the following paragraph should be added to sub-section (a):-

> "Difficulty is still being experienced in recruiting sufficient Scientific Officers qualified to undertake the research work of the Meteorological Office."

Galley 10. Sub-section (b) Joint Meteorological Radio Propagation Sub-Committee.

The Committee agreed that the second paragraph of this sub-section relating to the handbook on the meteorology of radio propagation should be deleted.

Galley 12. Para. (iii)

Professor Dobson suggested that this paragraph should be reworded, and it has been amended as follows:-

Lines 4 - 5.

Delete "are not inconsistent with concepts of the dynamical processes" and substitute "seem to be broadly in accord with recent concepts of the ascent and descent of air".

Galley 12. (v), para. 3.

The Director proposed and the Committee agreed that the whole of this paragraph should be deleted.

Galley 12. (v), para. 4.

The importance of the work which is being done by the Meteorological Research Flight was stressed and the necessity for providing suitable aircraft to enable the work to be carried out to the best advantage was emphasised. The Committee formally recorded their opinion of the importance of providing a suitable jet aircraft for the Meteorological Research Flight.

Galley 13. Section (2) Staff.

The Director drew attention to the staffing position in the Meteorological Office. Owing to additional commitments which have arisen during the year, the increase in the strengths of the Experimental Officer and Assistant (Scientific) classes reported at the last meeting has not proved sufficient to meet requirements. All practical steps are being taken to rectify matters, but shortage of staff in these two classes must be expected for the next few months. The Committee noted that five new Scientific Officers have been appointed during the year.

Galley 14. Sub-section (c) Uniformed Personnel - Air Meteorological Observers.

The Director drew the attention of the Committee to the introduction of a new long-term policy of recruiting Air Meteorological Observers from amongst Assistants who have had at least two years' experience in the Meteorological Office.

Galley 14. Sub-section (d) Training of Staff. Training of Dominion, Colonial and foreign personnel.

Mr. Bigg drew attention to the statement about the training of officers of the Colonial meteorological services, and suggested it would be preferable to omit the specific reference to Hong Kong Royal Observatory and state that five officers had been trained for the Colonial meteorological services.

Galley 15. Sub-section (b) Issue of Equipment.

The Committee agreed to delete the last three paragraphs of this sub-section.

Galley 15. Sub-section (a) Library. Exchanges of Publications.

It was agreed to delete the second, third and fourth paragraphs of this sub-section.

Galley 16. Co-operation with other British Libraries.

The Director proposed and the Committee agreed to the deletion of the second sentence of the first paragraph of this sub-section beginning "The Department of Scientific and Industrial Research" and ending "and Geophysics)".

Galley 16. Inquiries.

The Director proposed the deletion of the second paragraph of this sub-section giving details of inquirers. The Committee agreed.

Galley 16. Sub-section (b) Publications. Geophysical Memoirs and Professional Notes.

It was agreed to delete the last sentence of this paragraph beginning "Several Geophysical Memoirs" and ending "in the press".

Galley 16. Sub-section (b) Publications. Meteorological Magazine.

The Director proposed and the Committee agreed the following amendments to the first paragraph of this sub-section:-

Line 4. Delete "therefore".

Lines 5 - 6. Delete the last sentence, beginning "The new printer" and ending "up-to-date".

Galley 17. Sub-section (1) International Meteorological Organisation and World Meteorological Organisation.

The Director proposed the following amendments, which were agreed by the Committee:-

Para. 2, Line 1.

After "Directors" add "of the International Meteorological Organisation".

Para. 2, line 4.

For "March 15" read "March 19".

The Committee accepted the Annual Report of the Director for the year April 1, 1950 to March 31, 1951, subject to the amendments mentioned above and to any further amendments which members of the Committee and the Deputy Director of Intelligence might submit before 15th June.

1445. Annual Report of the Director of the Naval Weather Service, 1st April, 1950, to 31st March, 1951

The Chairman drew the attention of the Committee to the Annual Report of the Director of the Naval Weather Service for the year 1st April, 1950, to 31st March, 1951. (M.C.-30).

Instructor Captain Bracelin referred briefly to the more important items in the Report.

The Director referred to the paragraph about International Aerological Days (para. 25), and stated that the practice of holding "international aerological days" on a world wide basis had now been abandoned owing to the availability of frequent radio sonde ascents in many parts of the world. The Director also referred to para. 29 of the Report, which mentioned the work being done on the development of a small radio-sonde which will be light enough to be carried by the standard 100 gm. balloon used in H.M. Ships.

The Director expressed his appreciation of the close liaison which is maintained between the Meteorological Office and the Naval Weather Service.

The Chairman thanked the Director of the Naval Weather Service for his Annual Report, which was noted by the Committee.

446. Meteorological Research - Annual Report of the Meteorological Research Committee to the Secretary of State for Air for the year ended 31st March, 1951.

The Chairman referred to the Annual Report of the Meteorological Research Committee for the year ended 31st March, 1951 (M.C.-31) which had been submitted to the Secretary of State for Air.

Professor Dobson (Chairman of the Meteorological Research Committee) spoke about the more important items of research which had been under consideration during the year. (See also Minute 1444). The Director referred to the research which is being made into the problem of forecasting of fog, both from the scientific aspect and the short term application of the investigations. The Director also expressed his appreciation of the work done by the Meteorological Research Committee, and stressed the importance of the results of research in the day to day work of the Office.

The Committee noted the Report of the Meteorological Research Committee.

47. Annual Report of the Meteorological Committee to the Secretary of State for Air for the period 1st July, 1950, to 30th June, 1951.

The Chairman drew the attention of the Committee to the draft of the Annual Report of the Meteorological Committee to the Secretary of State for Air for the period 1st July, 1950, to 30th June, 1951. (M.C.-32).

The Committee approved the draft Annual Report subject to the following amendment:-

Para. 7. Add at end of second paragraph:-

"which is one of the most important provided by the Meteorological Office".

48. Advisory Committee on Meteorology for Scotland - Terms of Reference.

The Committee noted the paper M.C.-33 which gives the revised terms of reference and the composition of the Advisory Committee on Meteorology for Scotland.

49. International Meetings.

The Director reported that the World Meteorological Organisation has now taken over the functions formerly performed by the International Meteorological Organisation. He had attended the final Conference of Directors of the International Meteorological Organisation and the first Congress of the World Meteorological Organisation, which were held in Paris during March and April, 1951.

The Committee noted the international activities of the Meteorological Office as shown in the paper M.C.-34.

50. Date of Next Meeting.

The Chairman suggested that the date of the next meeting should be left open, and this was agreed.

51. The Committee rose at 12.50 p.m.

G.303084/HB/7/51/75.

M.C. - 29

METEOROLOGICAL COMMITTEE

Annual Report

of the Director of the
METEOROLOGICAL OFFICE
presented by the Meteorological Committee

to the Secretary of State for Air

for the year

April 1st 1950, to March 31st 1951.

The Annual Report which was previously circulated in proof stage, was accepted, subject to amendments, by the Committee - see Minute 1444.

M.C. - 30

METEOROLOGICAL COMMITTEE

Annual Report of the Director
of the Naval Weather Service
1 st April 1950, - 31st March 1951.

The Annual Report of the Director of the Naval Weather Service which was previously circulated, was noted by the Committee - see Minute 1445.

M.C. - 31

METEOROLOGICAL COMMITTEE

Report of the Meteorological Research Committee

to the

Secretary of State for Air

for the year ended 31st March, 1951.

The Report of the Meteorological Research Committee (M.R.P. 628) which was previously circulated was noted by the Committee - see Minute 1446.

METEOROLOGICAL COMMITTEE

AIR MINISTRY

Annual Report of the Meteorological Committee to the Secretary of State for Air for the period 1st July, 1950, to 30th June, 1951.

1. The Meteorological Committee met on 31st May, 1951. The meeting due to be held in November was not convened as there were no matters of sufficient importance to need discussion at a formal meeting. The Committee were informed by letter of those matters which it was necessary to bring to their attention.

2. Membership

The following changes have taken place in the membership during the year:-

Captain R.F. Nichols, R.N., has succeeded Captain F.M. Walton, R.N., as Director of the Naval Weather Service.

Major General K.F. MacK Lewis, C.B., D.S.O., M.C., has succeeded Major General S.B. Rawlins, C.B., C.B.E., D.S.O., M.C., as Director of Royal Artillery, War Office.

3. Report of the Director of the Meteorological Office

The Committee received the Report of the Director of the Meteorological Office for the year 1st April, 1950, to 31st March, 1951, and presented it (after amendment) to the Secretary of State for Air. The more important features of the report are discussed in subsequent paragraphs.

4. Report of the Director of the Naval Weather Service

The Committee received and took note of an abridged Report of the Director of the Naval Weather Service, Admiralty, for the year 1st April, 1950, to 31st March, 1951.

5. Staffing of the Meteorological Office

The Committee is glad to note that, although the difficulty of obtaining Scientific Officers continues, five new Scientific Officers have been appointed during the year. Owing to additional commitments which have arisen during the year, the increase in the strengths of the Experimental Officer and Assistant (Scientific) classes reported in the last Annual Report has not proved sufficient to meet requirements. All practical steps are being taken to rectify matters, but a shortage of staff in these two classes must be expected for the next few months. The Committee notes that the continued resignation of Assistants (Scientific) involves frequent replacement of trained assistants by comparatively inexperienced staff. Enquiry has revealed that the abnormal hours of working and the liability to be posted away from their home areas are two of the factors responsible for these resignations. Recently increased salaries for Assistants have been approved, and it is hoped that this will check the losses which have been going on.

6. Vacation Students

Mention was made in the last Annual Report that the scheme whereby vacation students are attached to research establishments in Government Departments was being curtailed. Only eight students could be taken in the Meteorological Office during the 1950 summer vacation, viz: two students from Birmingham University and one each from King's College, Queen Mary College, Imperial College of Science, London, St. John's College, Cambridge, and the Universities of Bristol and Leeds.

The Committee is glad to note that the Treasury has now decided that the scheme will be continued in future on a more liberal basis. The Treasury have been informed that up to twelve students per annum are desired for the Meteorological Office.

/7.

7. Broadcasting of Weather Forecasts

The Committee is pleased to note that as a result of discussions between the Meteorological Office and the British Broadcasting Corporation on the better use of broadcasting time, regional weather forecasts have been broadcast daily at 5.55 p.m. by each B.B.C. regional station, since the 19th November, 1950. The Committee hope that the B.B.C. will be able to extend the regional weather forecasts to the morning and midday broadcasts. The former would be particularly valuable.

The Committee regrets to learn that despite prolonged examination of the problem, it has been found impracticable to make a broadcasting frequency available for the restoration of the AIRMET service. The Committee hopes that further efforts will be made to reinstate this service, which is one of the most important provided by the Meteorological Office.

8. Meteorological Research

The Committee noted the Report of the Meteorological Research Committee for the year ended 31st March, 1951. The staffing of research units cannot yet be considered satisfactory, and the Committee notes that efforts will be made to recruit suitable men so that in time adequate research groups can be built up. The economic and military importance of an increased knowledge of meteorology requires more and more detailed and specialized research, and it would be possible to employ to advantage a larger research staff than was visualised three or four years ago. The Committee notes the progress which has been made in the exploration of the stratosphere, the meteorological factors which affect the operation of jet aircraft at great heights, and the structure and regions of turbulence within cumulo-nimbus clouds.

The Committee is also glad to note that the Air Ministry grant to the Gassiot Committee of the Royal Society for the prosecution of long term fundamental investigations in atmospheric physics is to be continued for a further five years as from 1st April, 1951, and that the total grant has been increased from £20,000 to £25,000.

9. Advisory Committee on Meteorology for Scotland

The Advisory Committee on Meteorology for Scotland met on 21st June, 1951. The composition of the Advisory Committee has been extended to include representatives from each of the four Scottish Universities. The Meteorological Committee notes with interest the increased attention which is being given to agricultural meteorology in Scotland.

10. International Meteorology

The Committee noted the international meetings attended by the staff of the Meteorological Office during the year.

The Committee also noted that the World Meteorological Organisation has now taken over the functions formerly performed by the International Meteorological Organisation. The more official status, the wider programme and enlarged secretariat of the new Organisation indicate the increased importance which nations now attach to international co-operation in the field of meteorology.

AIDAN CRAWLEY

Chairman.

12th September, 1951.

M.C. - 33.
M.C.(S)-8

Advisory Committee on Meteorology for Scotland

Terms of Reference

1. Functions

The Advisory Committee on Meteorology for Scotland is an advisory body with the following duties:-

(a) To review the development of meteorological science and its application in Scotland.

(b) To submit to the Meteorological Committee any proposals in connection therewith.

2. Composition

The Advisory Committee on Meteorology for Scotland shall be composed of:-

Director of the Meteorological Office (Chairman)
One member nominated by the Department of Agriculture for Scotland
" " " " " Scottish Home Department (Fisheries Dvision)
" " " " " Department of Health for Scotland
" " " " " Royal Society of Edinburgh
" " " " " Royal Society of London
" " " " " Royal Meteorological Society
" " " " " University of St. Andrews
" " " " " University of Glasgow
" " " " " University of Aberdeen
" " " " " University of Edinburgh

3. Meetings

The Committee shall meet at least once a year.

4. Expenses

The members of the Advisory Committee shall not receive remuneration for their services, but travelling and subsistence expenses will be allowed in the case of members who do not reside in Edinburgh.

(Sgd.) AIDAN CRAWLEY

Chairman, Meteorological Committee

November, 1950.

G.278403/MFG/11/50/50

M.C.-34.

METEOROLOGICAL COMMITTEE
AIR MINISTRY

INTERNATIONAL MEETINGS (1st July, 1950 to 30th June, 1951).

Meetings of international organisations have been attended by members of the staff of the Meteorological Office as follows :-

1. INTERNATIONAL METEOROLOGICAL ORGANISATION (now the WORLD METEOROLOGICAL ORGANISATION).

(a) Committee for the Study of Clouds and Hydrometeors, held in Paris, 4th January to 19th January, 1951, attended by :-

Mr. C.K.M. Douglas.

(b) Working Group to establish plan for Technical Regulations for the World Meteorological Organisation, held in Lausanne, 22nd January to 27th January, 1951, attended by :-

Mr. E.G. Bilham.

(c) Final Conference of Directors of the International Meteorological Organisation, held in Paris, 15th to 17th March, 1951, attended by :-

The Director (President).

First Congress of the World Meteorological Organisation, held in Paris, 19th March to 28th April, 1951, attended by :-

The Director (President)
Mr. H.T. Smith (Head of S.4)
Mr. E.G. Bilham (D.D.M.C.(F)
Commander C.E.N. Frankcom (former President of
Commission for Maritime Meteorology)
Captain R.F. Nichols (D.N.W.S.)
Inst. Capt. P. Bracelin (D/D.N.W.S.)
Mr. J. Riley (M.C.A.).

2. INTERNATIONAL CIVIL AVIATION ORGANISATION.

(a) Middle East Regional Air Navigation Meeting, held in Istanbul, 17th October to 6th November, 1950, attended by :-

Mr. W.H. Bigg
Mr. M.J. Thomas

(b) A Special Meteorological Meeting of the Africa - Indian Ocean, European - Mediterranean and North Atlantic Regions, held in Paris, 8th November to 6th December, 1950, attended by :-

Mr. J. Durward
Mr. G.J.W. Oddie.

Meteorological Office,
Air Ministry, London, W.C. 2.
May, 1951.

IMPORTANT
All communications must be addressed to THE DIRECTOR
In reply to this letter quote
A.968486/48/D.M.O.
Telegrams:—"WEATHER TELEX LONDON"
Telephone:—HOLBORN 3434
Extension

METEOROLOGICAL OFFICE
AIR MINISTRY
KINGSWAY
LONDON, W.C.2

13 December, 1951.

Dear Sir,

No matters of sufficient importance have arisen since the Committee met in June to warrant discussion at a formal meeting, and in accordance with the usual practice, agreed by the Committee, the Chairman has asked me to inform you that, unless any member particularly wishes him to call a meeting, he proposes to consider the information contained in this letter as officially communicated to members and as taking the place of this year's autumn meeting.

2. The Annual Report of the Meteorological Committee for the year 1st July, 1950 to 30th June, 1951 was submitted to the Secretary of State for Air on 5th September, 1951.

3. Instructor Captain P. Bracelin, M.A., O.B.E., R.N., has succeeded C Captain R.F. Nichols, R.N., as Director of the Naval Weather Service and as the Admiralty representative on the Meteorological Committee.

4. The Advisory Committee on Meteorology for Scotland met on 21st June, 1951 at the Meteorological Office, Edinburgh. A senior scientific officer post has been established at the Edinburgh office to deal with agricultural meteorological problems in Scotland.

5. Ten scientific officers have been recruited to the Meteorological Office this year. When all have taken up their appointments the overall deficiency in the Scientific Officer class will be reduced to eight. There is reason to expect that all the vacancies in this class will be filled next year.

The staffing position in the Experimental Officer and Assistant classes is less satisfactory. An appreciable increase in the strength of these classes is needed to meet the requirements of the Royal Air Force. The demand for men with qualifications which would admit them to the Experimental and Assistant classes is abnormally high at the present time, not only in the Meteorological Office but throughout the country generally. All possible steps are being taken to gain recruits, but a shortage of staff in these two classes must be expected to continue for some time.

6. The student vacation scheme has been in operation again this year. Applications for attachment were received from twenty-seven students at seventeen universities. It is of interest to note that three of the ten scientific officers appointed to the Meteorological Office this year are former vacation students.

Circular letters have been sent to Professors notifying them that the scheme will again be in operation next year. The notifications have been issued earlier this time, at the request of the University members of the Advisory Committee on Meteorology for Scotland, so as to give students ample time to make arrangements for the long vacation.

7. The method of printing the Observatories Year Book is under discussion with His Majesty's Stationery Office. It is now proposed to publish abridged tables and text for two years in one volume and that two volumes (i.e. four years' data) should be issued per annum until the arrears have been disposed of.

To Members of the Meteorological Committee.

/8.

8. Arrangements have been made with the General Post Office to include in the Post Office Area Telephone Directories information about the facilities which are available to the public for obtaining weather information and forecasts by telephone in certain areas.

9. As a result of discussions with the British Broadcasting Corporation, enlarged charts which give viewers a better representation of the synoptic situation were introduced in the television programme on 16th September. A daily broadcast of synoptic charts and forecasts commenced on 12th October from the new B.B.C. television transmitting station at Holme Moss (Yorkshire).

10. Members of the Meteorological Office staff have attended the following international meetings:-

World Meteorological Organisation.

Committee for Clouds and Hydrometeors, held at Uccle, 16th to 19th August, 1951, attended by:-

Mr. C.K.M. Douglas.

Executive Committee, held at Lausanne, 11th to 13th October, 1951, attended by:-

Mr. J. Durward (as the Director's representative).

Sub-Committee on Experimental Aerology, held at Zurich, 25th October to 3rd November, 1951, attended by:-

Dr. D.N. Harrison.

International Union of Geodesy and Geophysics.

Ninth General Assembly, held at Brussels, 21st August to 1st September, 1951, attended by:-

Dr. J.M. Stagg (General Secretary)
Mr. H.W.L. Absalom
Mr. H.H. Lamb
Mr. F. Pasquill
Dr. G.D. Robinson
Dr. R.C. Sutcliffe.

International Civil Aviation Organisation.

South America/South Atlantic Regional Air Navigation Meeting, held at Buenos Aires, 30th October, 1951, for three to four weeks, attended by:-

Mr. W.H. Bigg.

Other International Meetings.

Conference on Maritime Meteorology, held by the Geophysical Institute of Genoa, 20th to 22nd September, 1951, attended by:-

Mr. A.H. Gordon.

Extraordinary Administrative Radio Conference, held at Geneva, 10th to 24th September, 1951, attended by:-

Mr. C.V. Ockenden (as W.M.O. Observer).

11. Unless a reply is received from you, it will be assumed that you agree with the Chairman's suggestion in the opening paragraph of this letter.

Yours faithfully,

Williams

Secretary,
Meteorological Committee.

G.314096/CB/11/51/50

MINUTES

METEOROLOGICAL COMMITTEE

One Hundred and Sixty-Seventh Meeting, held in
Historic Room 24, 4th Floor, Air Ministry, Whitehall Gardens,
S.W.1, at 11 a.m. on 12th June, 1952.

PRESENT:-

Mr. George Ward, M.P. (Chairman)
Under Secretary of State for Air

Mr. W.J. Bigg (Colonial Office)
Instr.-Captain P. Bracelin (Director, Naval Weather Service)
Professor G.M.B. Dobson (Royal Society)
Mr. W.B. Foden (Air Ministry)
Sir Harry Garner (Ministry of Supply)
Air Commodore H.R. Graham (Air Ministry)
Professor W.M.H. Greaves (Royal Society of Edinburgh)
Sir Nelson Johnson (Director, Meteorological Office)
Major General K.F. MacK. Lewis (War Office)
Mr. G.W. Stallibrass (Ministry of Civil Aviation)
Professor O.G. Sutton (Royal Society)
Captain H. Topley (Ministry of Transport)
Mr. R.J. Williams (Secretary)

Apology for absence was received from:-

Sir Edward Salisbury (Ministry of Agriculture and Fisheries)

1452. The Minutes of the 166th Meeting held on 31st May, 1951, were confirmed.

1453. Action arising out of the 166th Meeting

The Director reported that action arising from the Minutes of the 166th Meeting was covered by later items on the Agenda for the present meeting.

1454. Membership

The Chairman reported that since the last meeting, Instructor Captain P. Bracelin, O.B.E., R.N., had succeeded Captain R.F. Nichols, R.N., as Director of the Naval Weather Service. The Chairman extended a warm welcome to Captain Bracelin on behalf of the Committee.

1455. Annual Report of the Director of the Meteorological Office for the year April 1, 1951, to March 31, 1952.

The Chairman asked the Committee to consider the Annual Report of the Director of the Meteorological Office for the year April 1, 1951, to March 31, 1952. (M.C.-35)

The Director suggested that, to save time, members should inform the Secretary, within a week, of any editorial amendments they wished to make in the Report. This was agreed.

The Director proceeded to draw the attention of the Committee to matters of particular interest in the Report:-

Page 6. The Director referred to the part which the Meteorological Office had taken in the Festival of Britain. This had afforded an opportunity of placing before the public some aspects of the weather service in a manner which had not hitherto been possible. Specimens of the "Souvenir Weather Report and Forecast" produced by the forecasting unit were placed on the table. Over 150,000 copies of these reports were sold to visitors.

/Page 7.

Page 7. The Director stated that since the paragraph about radio-sonde and radar-wind stations was drafted it had been decided, for reasons of economy, to reduce the programme of routine upper air ascents in the United Kingdom. Radar-wind observations continue to be made four times daily, but the radio-sone ascents have been reduced from four to two daily. This reduction in the radio-sonde programme would not seriously impair the efficiency of the forecasting service and was still above the minimum programme agreed upon internationally. He mentioned that the French Meteorological Service had also found it necessary to curtail their programme of radio-sonde ascents for the same reason.

Page 8. The Director drew attention to the development by a British firm of a radio facsimile transmitter and recorder for the transmission of weather charts. It was hoped that trials of the equipment would be made in the United Kingdom this summer. A demonstration of the transmission by W/T of facsimile weather charts from England to Switzerland had been given during the recent meeting of the European Regional Association of the World Meteorological Organisation at Zurich. The technique had, however, not yet reached a stage which would reproduce all the detailed information which is plotted on a normal weather chart. (See also Minute 1456).

Page 8. The Committee discussed at some length the question of the resumption of AIRMET broadcasts.

Professor Dobson emphasised that the AIRMET broadcasts had proved to be of greater service to the general public than any other type of service provided by the Meteorological Office. He asked that the letter which the scientific members of the Committee had written to the Chairman should form an attachment to the Minutes of today's meeting. This was agreed.

The Chairman stated that the position had been kept under close watch since the last meeting with a view to the resumption of AIRMET broadcasts, and referred to the difficulties connected with the problem.

Professor Sutton and Professor Greaves both stressed the importance of the broadcasts being given by a meteorologist and not by a B.B.C. announcer.

The Committee desired to place on record their opinion that further active steps should be taken with a view to securing a suitable broadcasting frequency at the earliest opportunity.

In the meantime, the British Broadcasting Corporation should be asked to give time for the inclusion of broadcasts of weather information every two hours in one of the normal daily programmes in addition to the present weather broadcasts at 0655, 0755, 1255 and 1755. The Director agreed to work out the minimum time (e.g. five minutes) which would be required for the suggested broadcasts.

The Committee agreed that the contents of the broadcasts should be designed to meet the requirements of the general public and that they should not be primarily for aviation purposes. (See also Minute 1458).

Page 11. In connection with the services provided for civil aviation, the Director reported the formation recently of a M.C.A. Meteorological Standing Committee. The committee deals with matters of policy affecting civil aviation in the same way as the R.A.F. Meteorological Policy Committee deals with problems affecting the Royal Air Force. The Director welcomed the formation of this new committee, which will be of great assistance to the Meteorological Office in civil aviation matters.

Page 13. Professor Greaves stated that in a recent conversation with the Captain of a B.E.A.C. aircraft the latter had expressed his high opinion of the reliability of the meteorological advice which he received for his day to day flights. The Captain suggested, however, that there was scope for improvement in the information supplied for the observed height of cloud base. The Director recognised the difficulties of giving precise information about cloud height under marginal conditions. Under such conditions the height of cloud base was subject to rapid fluctuations and was therefore not susceptible of precise specification.

Page 20. The Director mentioned that it was hoped before long to publish the climatological data from bases in the Falkland Islands Dependencies which had been collected since 1944. The publication of this material would assist in securing the recognition of the Falkland Islands Dependencies as British territory. Mr. Bigg enquired whether the meteorological service in the Falkland Islands was functioning satisfactorily. The Director confirmed that this was so.

Pages 27-35. The section of the Annual Report dealing with Research and Development is discussed under item 6 of the Agenda - the Report of the Meteorological Research Committee. (M.C.-37) (See Minute 1457 below).

Mr. Stallibrass drew attention to the value of the statistical technique developed by C.S. Durst for short period planning forecasts (page 30). The Director remarked that this technique was of an interim nature and would be superseded by more conventional techniques as more knowledge of high-level winds becomes available.

Page 35. The Director stated that as a consequence of a Treasury directive a "ceiling" had been imposed on the number of staff in the Meteorological Office. The establishments of staff were at present under review to ensure that available staff were allocated to the best advantage of the various users. The requirements of the Royal Air Force were expanding and every endeavour would be made to avoid sacrificing the requirements of research to meet the demands of operational users.

Professor Sutton stressed the importance of having more meteorological research carried out at universities. He suggested that universities would pay greater attention to meteorological problems if professorships and lectureships in meteorology were established at more universities. At present only Oxford, Cambridge, London and Edinburgh Universities pay any attention to meteorology.

Professor Dobson referred to the steps taken by the Royal Society five years ago to encourage wider study of meteorology at universities.

The Director stated that the matter had been discussed by the Universities Grants Committee, and he understood that the Universities Grants Committee had taken the view that the limited number of expert meteorologists available made it preferable to concentrate on one or two universities rather than to spread the effort over a wider field.

Professor Sutton suggested that the Royal Meteorological Society should be invited to examine this question and to report their recommendations. The Director considered that the Gassiot Committee of the Royal Society was the appropriate body from which to seek advice. The meeting, however, agreed to adopt Professor Sutton's suggestion. (See also Minute 1458).

Captain Topley wished to place on record the appreciation of the Ministry of Transport for the assistance given by the Marine Branch of the Meteorological Office in connection with the examinations held by the Ministry for Masters and Mates Certificates.

The Committee accepted the Annual Report of the Director for the year April 1, 1951, to March 31, 1952, subject to any amendments which members of the Committee might submit before 19th June.

/1456.

1456. Annual Report of the Director of the Naval Weather Service, 1st April, 1951, to 31st March, 1952.

The Chairman drew the attention of the Committee to the abridged edition of the Annual Report of the Director of the Naval Weather Service for the year 1st April, 1951, to 31st March, 1952. (M.C.-36).

Instructor Captain Bracelin referred briefly to the following items in the Report:-

A meteorological teleprinter network had now been completed after some considerable delay within the Home Air Command, and will prove to be of great benefit to the Naval Weather Service.

Radio-sondes had been released for the first time in H.M. Ships during a recent voyage of an aircraft carrier. Although difficulties were encountered during the trials, half the ascents were considered satisfactory. Captain Bracelin emphasised the urgent need of the Naval Weather Service for a light weight radio-sonde transmitter which the Meteorological Office was developing for the Naval Weather Service.

Extensive preliminary trials of the transmission of weather charts by means of facsimile equipment have been carried out in one of H.M. Ships. This method of transmitting weather charts is of great importance to the Navy and trials with this equipment are continuing. (See also Minute 1455, page 8).

Trials had also been carried out of a distant reading electrical psychrometer which will record readings of wet and dry bulb temperatures at different heights above the sea. Temperature and humidity gradients are of interest to the Navy, especially in connection with problems of radar propagation.

The Chairman thanked the Director of the Naval Weather Service for his Annual Report, which was noted by the Committee.

1457. Report of the Meteorological Research Committee to the Secretary of State for Air for the year ended 31st March, 1952.

The Chairman referred to the Report of the Meteorological Research Committee for the year ended 31st March, 1952 (M.C.-37), which had been submitted to the Secretary of State for Air.

Professor Dobson (Chairman of the Meteorological Research Committee) spoke about the more important items in the Report, and mentioned Professor Paneth's work, in conjunction with the Rocket Research in the U.S.A., on the analysis of air samples obtained from heights up to 70 kms. Professor Paneth's work, which is giving information of great value, is financed by funds put at the disposal of the Royal Society by the Treasury at the behest of the Air Ministry. Another method for obtaining samples of air at great heights is being developed at Oxford University under the direction of Professor Simon. He also drew attention to the work which is being done in connection with forecasting and aviation problems (see also Minute 1455, pages 27-35) and to the work which is being carried out at East Hill with the use of radar.

Professor Dobson stressed the need for a fast high-flying aircraft to be placed at the disposal of the Meteorological Research Flight. After some discussion the Committee recommended that Air Commodore Graham should represent to the Vice Chief of the Air Staff the importance of equipping the Meteorological Research Flight with a Canberra aircraft as early as possible. There are many meteorological problems of great importance to both the Royal Air Force and civil aviation which cannot be investigated until a high speed aircraft is available. (See also Minute 1458).

The Chairman thanked Professor Dobson for his remarks.

Mr. Stallibrass referred to a recent symposium convened by the Royal Meteorological Society to discuss the meteorological problems connected with high speed flying at great altitudes. He found that all the problems which emerged from the discussion were already included as high-priority items in the programme of the Meteorological Research Committee.

The Committee noted the Report of the Meteorological Research Committee.

1458. Annual Report of the Meteorological Committee to the Secretary of State for Air for the period 1st July, 1951, to 30th June, 1952.

The Chairman asked the Committee to consider and amend as necessary the draft Annual Report of the Meteorological Committee to the Secretary of State for Air for the period 1st July, 1951, to 30th June, 1952. (M.C.-38).

The Committee approved the draft Annual Report subject to the following amendments:-

Para. 4. Delete the last sentence of this paragraph and substitute the following:-

"The Committee concurs in the views expressed by the scientific members and recommends that further active steps should be taken with a view to securing a suitable broadcasting frequency at the earliest opportunity.

In the meantime, the British Broadcasting Corporation should be asked to give time for the inclusion of broadcasts of weather information every two hours in one of the normal daily programmes in addition to the present weather broadcasts at 0655, 0755, 1255 and 1755.

The Committee recommended that the contents of the broadcasts should be designed to meet the requirements of the general public and that they should not be primarily for aviation purposes.

(See also Minute 1455, Page 8).

Para. 10

(a) Add at the end of the first sub-paragraph:-

"and recommends that the Air Staff should re-examine the possibility of allotting one Canberra aircraft to the Meteorological Research Flight."

(b) Add the following third sub-paragraph:-

"The Committee are seeking the advice of the Royal Meteorological Society as to ways of encouraging more universities to take an active interest in meteorology."

(See also Minute 1455, page 35).

1459. International Meetings

The Committee noted the international activities of the Meteorological Office as shown in the paper M.C.-39.

1460. Date of Next Meeting

The Committee suggested that the date of the next meeting of the Committee should be left open, and this was agreed.

1461. The Committee rose at 12.25 p.m.

METEOROLOGICAL COMMITTEE

AIR MINISTRY

APPENDIX to the Minutes of the 167th Meeting, held on 12th June, 1952.

Letter dated 17th January, 1952, addressed to the Chairman by the Scientific Members of the Meteorological Committee

Watch Hill,
The Ridings,
Shotover,
OXFORD.

17th January, 1952.

The Under Secretary of State,
Air Ministry,
London.

Dear Sir,

Meteorological Committee
Dissemination of Meteorological Forecasts

As members of the Meteorological Committee representing scientific and general interests we would like to place on record our views on the dissemination of meteorological forecasts as set out below:-

The improvement in forecasting weather which has taken place in recent years has been great if we consider only short period forecasts. This improvement has been due partly to an increase in knowledge of weather processes and partly to improvements in communications, enabling the forecaster to obtain a much fuller and more detailed picture of the existing weather at all times of the day and night. Forecasts for 24 hours ahead or longer have shown less improvement and their accuracy is still far behind what could be desired. (These facts are strikingly brought out in a recent paper to the Meteorological Research Committee by the Chief Forecaster, Mr. C.K.M. Douglas (M.R.P.-654).

In order that the user may obtain full advantage of the short period forecasts it is necessary that he should receive them within an hour or so of their issue by the forecaster. There is little doubt that this was largely the reason for the great use made by the general public of the 'Airmet' broadcasts, although these broadcasts were solely intended for use by aviation circles. If, therefore, the general public are to obtain full advantage of the present accuracy of short period forecasts, means must be found for disseminating them as rapidly as possible. Spoken radio broadcasts seem to be the only possible method.

At the present time civil and military aviation alone are able to take full advantage of the accuracy of short-term forecasts owing to the elaborate system used in disseminating the forecasts for their use - teleprinters and local forecast offices. It would seem that the Air Ministry might well be open to the charge that, by providing this system for their own use, while doing little or nothing to provide similar services for the public, the situation has arisen in which they are doing exactly what some people feared when the Meteorological Office passed under Air Ministry control, viz. that the public would not receive adequate attention. Public expression has already been given to this charge in the presidential address to the Royal Meteorological Society by Sir Robert Watson-Watt, who went so far as to suggest the holding of a public enquiry into the best organisation for the national weather service. By contrast, the effort put into the dissemination of forecasts which would be used, for example, by Agriculture (which is the country's largest single industry) is an almost negligible fraction of that given to the forecasts for aviation. An early morning short-term forecast would most certainly be used by a very large number of farmers in planning their day's work.

Apart from the desirability of giving the public the benefit of short-term forecasts, there is no doubt that the description of existing weather, the changes which had recently taken place and the changes to be expected in the immediate sequel, as given in 'Airmet' in the talk by the forecaster himself, gave the public a much better idea of what to expect, and was much more what it wanted, than the brief written forecast read by a B.B.C. announcer. A very valuable feature of the 'Airmet' broadcasts was that the broadcast was given by the forecaster himself and that he was at liberty to give an extempore dissertation on his own lines. There is an enormous difference between the information which can be conveyed in this way by an experienced forecaster and that conveyed by a B.B.C. announcer who is reading matter which he doesn't really understand. The 'Airmet' broadcasts thus gave the public the great advantage of being in more direct contact with the forecaster, who could explain his difficulties and indicate the degree of probability attached to each forecast.

The only satisfactory solution seems to be the introduction of a new service for the public with a special broadcast which most parts of the country could receive on a wavelength covered by normal broadcast receivers, and the forecaster himself should broadcast the information at frequent intervals - certainly at least once per hour during daytime. In no other way does it seem possible to give the public the service they require and which could now be given.

The difficulty of allotting a wavelength for this service is fully recognised but we consider that the value of these public broadcasts is so great that sufficient pressure should be applied to overcome the difficulty. It seems very anomalous that, when the great difficulties of making satisfactory forecasts of weather - if only short period forecasts - have to some extent been overcome, the advantages to the public which should naturally follow should be held up by what is really a minor administrative difficulty.

Yours faithfully,

(Signed)
Sir David Brunt, Sec. R.S.,
Dept. of Meteorology,
Imperial College of Science
& Technology,
London.

DAVID BRUNT.

G.M.B. Dobson, C.B.E., F.R.S.,
Clarendon Laboratory,
Oxford.

G.M.B. DOBSON.

Prof. W.M.H. Greaves, M.A., F.R.S.,
Royal Observatory,
Edinburgh, 9.

W.M.H. GREAVES.

Prof. O.G. Sutton, C.B.E., D.Sc., F.R.S.,
Military College of Science,
Shrivenham, Nr. SWINDON, Wilts.

O.G. SUTTON.

M.C. - 35

METEOROLOGICAL COMMITTEE

Annual Report
of the Director of the
Meteorological Office
presented by the Meteorological Committee
to the Secretary of State for Air
for the year
April 1st 1951 to March 31st 1952.

The Annual Report which was previously circulated in proof stage was accepted, subject to amendments, by the Committee - see Minute 1455.

M.C. -36

METEOROLOGICAL COMMITTEE

Annual Report of the Director
of the Naval Weather Service

(Abridged edition)

1st April 1957 - 31st March 1952.

The Annual Report of the Director of the Naval Weather Service which was previously circulated, was noted by the Committee - see Minute 1456.

M.C. - 37

METEOROLOGICAL COMMITTEE

Report of the Meteorological Research Committee

to the

Secretary of State for Air

for the year ended 31st March 1952.

The Report of the Meteorological Research Committee (M.R.P. 719A) which was previously circulated was noted by the Committee - see Minute 1457.

METEOROLOGICAL COMMITTEE

AIR MINISTRY

Annual Report of the Meteorological Committee to the Secretary of State for Air for the period 1st July, 1951, to 30th June, 1952.

1. The Meteorological Committee met on 12th June, 1952. The meeting due to be held in November was not convened as there were no matters requiring discussion at a formal meeting. Matters which it was necessary to bring to the attention of the Committee were communicated by letter.

2. Membership

Instructor Captain P. Bracelin, O.B.E., R.N., Director of the Naval Weather Service, has succeeded Captain R.F. Nichols, R.N. as the representative of the Admiralty.

3. Annual Report of the Director of the Meteorological Office.

The Committee received the Annual Report of the Director of the Meteorological Office for the year 1st April, 1951 to 31st March, 1952, and presented it (after amendment) to the Secretary of State for Air. The more important features of the report are mentioned below.

4. Airmet Broadcasts

The Committee regrets to learn that it has not yet been found practicable to resume the "Airmet" broadcasts. In a letter to the Chairman, the scientific members of the Committee recorded their views on the dissemination of meteorological forecasts and emphasised the importance for the general public, particularly agricultural interests, to obtain full advantage of the present accuracy of short period forecasts for which spoken radio broadcasts seem to be the only possible means. The Committee concurs in the views expressed by the scientific members and recommends that further active steps should be taken with a view to securing a suitable broadcasting frequency at the earliest opportunity.

In the meantime, the British Broadcasting Corporation should be asked to give time for the inclusion of broadcasts of weather information every two hours in one of the normal daily programmes in addition to the present weather broadcasts at 0655, 0755, 1255 and 1755.

The Committee recommends that the contents of the broadcasts should be designed to meet the requirements of the general public and that they should not be primarily for aviation purposes.

5. Festival of Britain, 1951.

The Meteorological Office provided a meteorological exhibit in the Dome of Discovery on the South Bank site. This afforded an opportunity of placing before the public some aspects of the weather service in a manner which has not hitherto been possible. The main part of the exhibit was the weather forecasting unit. With the co-operation of H.M. Stationery Office a souvenir weather chart and forecast was prepared, reproduced and sold to the public in the Dome. Over 150,000 copies were sold. The Committee wish to stress the great value of publicity of this kind which serves to educate the public on the internal working of the Meteorological Office.

6. Report of the Director of the Naval Weather Service.

The Committee received and took note of the abridged Report of the Director of the Naval Weather Service, Admiralty, for the year 1st April, 1951, to 31st March, 1952.

/7.

7. Staffing of the Meteorological Office

The Committee noted that as a consequence of Treasury directives it has been necessary for a "ceiling" to be imposed on the number of staff in the Meteorological Office, and this would limit fresh recruitment.

Ten Scientific Officers have been recruited during the year, but the loss of an equal number has left the deficiency (12) in the Scientific Officer class unchanged.

As a result of Royal Air Force expansion, the demand for staff in the Experimental Officer and Assistant (Scientific) classes has increased rapidly. The "ceiling" limitations referred to above do not permit a corresponding increase in combined numbers in the two classes as a whole, but the possibility of staff economies and redeployment is under consideration. The Committee was concerned to note that the rate of resignations among Assistants (Scientific) continues to be high with the consequent loss of efficiency; which results partly from the constant changes of staff involved and partly from the high proportion under training. All possible steps are being taken to gain recruits, but the shortage of staff in these two classes must be expected to continue for some time.

8. Vacation Students

The student vacation scheme was in operation again this year. Applications for attachment were received from twenty-seven students at seventeen universities. The Committee was pleased to note that three of the ten scientific officers appointed to the Meteorological Office during the year were former vacation students.

9. The Director addressed a meeting of the Parliamentary and Scientific Committee on 20th November, 1951 on the work and aims of the Meteorological Office. Many questions were asked, and in some cases the verbal reply was followed up by supplementary information given by correspondence. Fifteen members of the Committee visited the Central Forecasting Office at Dunstable on 15th May, 1952.

10. Meteorological Research

The Committee took note of the Report of the Meteorological Research Committee for the year ended 31st March, 1952. The Committee noted with satisfaction that some increases have been made in the establishment of staff at research units, but urges that the need to maintain a vigorous research effort within the Meteorological Office should be kept in the forefront when considering measures of economy and additional demands for operational services. The Committee wishes to direct attention to the urgent need for a fast high-flying aircraft to be placed at the disposal of the Meteorological Research Flight for investigations which have a direct bearing on civil and military aviation at high levels and highspeeds, and recommends that the Air Staff should re-examine the possibility of allotting one Canberra aircraft to the Meteorological Research Flight.

The Committee noted the progress which has been made in a number of problems many of which have an important and direct bearing upon the service which the Meteorological Office renders to the community.

The Committee is seeking the advice of the Royal Meteorological Society as to ways of encouraging more universities to take an active interest in meteorology.

/11.

11. Advisory Committee on Meteorology for Scotland

The Advisory Committee on Meteorology for Scotland met on the 26th June, 1952 at the Meteorological Office, Edinburgh.

12. International Meteorology

The Committee noted the continued activities of the Meteorological Office in the field of international meteorology.

(Sgd) GEORGE WARD

Chairman.

1st September, 1952.

METEOROLOGICAL COMMITTEE

AIR MINISTRY

INTERNATIONAL MEETINGS (July 1951 to June 1952)

1. WORLD METEOROLOGICAL ORGANISATION

(a) Committee on Clouds and Hydrometeors, held at Uccle, 16th to 19th August, 1951, attended by:-

Mr. C.K.M. Douglas

(b) Executive Committee, held at Lausanne, 11th to 13th October, 1951, attended by:-

Mr. J. Durward (as the Director's representative)

(c) Sub-Committee on Experimental Aerology, held at Zurich, 25th October to 3rd November, 1951, attended by:-

Dr. D.N. Harrison

(d) Sub-Commission on Telecommunications of Regional Association VI (Europe), held at Paris, 11th to 23rd February, 1952, attended by:-

Mr. C.V. Ockenden
Mr. R. Cranna

(e) Regional Association VI (Europe), held at Zurich commencing 26th May, 1952, attended by:-

Mr. E.G. Bilham
Mr. C.V. Ockenden

2. INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS

Ninth General Assembly, held at Brussels, 21st August to 1st September, 1951, attended by:-

Dr. J.M. Stagg (General Secretary)
Mr. H.W.L. Absalom
Mr. H.H. Lamb
Dr. F. Pasquill
Dr. G.D. Robinson
Dr. R.C. Sutcliffe

Dr. Stagg ceased to be General Secretary as from the end of the Brussels meeting.

3. INTERNATIONAL CIVIL AVIATION ORGANISATION

(a) South America/South Atlantic Regional Air Navigation Meeting, held at Buenos Aires, 30th October, to 20th November, 1951, attended by:-

Mr. W.H. Bigg

(b) European/Mediterranean Regional Air Navigation Meeting, held at Paris, 26th February to 24th March, 1952, attended by:-

Mr. G.A. Corby
Mr. M.H. Freeman

4. OTHER INTERNATIONAL MEETINGS

(a) Extraordinary Administrative Radio Conference, held at Geneva, 10th to 24th September, 1951, attended by:-

Mr. C.V. Ockenden (as W.M.O. Observer)

/(b)

(b) Conference on Maritime Meteorology, held by the Geophysical Institute, Genoa, 20th to 22nd September, 1951, attended by:-

Mr. A.H. Gordon

(c) Symposium on Air Trajectories, held at Washington, D.C., under the auspices of the United States Weather Bureau, 21st to 25th January, 1952, attended by:-

Dr. F. Pasquill

Meteorological Office,
Air Ministry, London, W.C.2.
May, 1952.

IMPORTANT

All communications must be addressed to THE DIRECTOR

In reply to this letter quote
A.968486/48/D.M.O.

Telegrams :—" WEATHER TELEX LONDON "
Telephone :—HOLBORN 3434
Extension. :

METEOROLOGICAL OFFICE,
AIR MINISTRY,
KINGSWAY,
LONDON, W.C.2.

11 December, 1952.

Dear Sir,

Again this year, no matters of sufficient importance have arisen since the Committee met in June to warrant discussion at a formal meeting, and in accordance with the usual practice, agreed by the Committee, the Chairman has asked me to inform you that, unless any member particularly wishes him to call a meeting, he proposes to consider the information contained in this letter as officially communicated to members and as taking the place of this year's autumn meeting.

2. The Annual Report of the Meteorological Committee for the year 1st July 1951 to 30th June 1952 (amended as indicated in the Minutes of the last meeting) was submitted to the Secretary of State for Air on 1st September. The Secretary of State read the Report with great interest.

3. The Advisory Committee on Meteorology for Scotland met on 26th June, 1952, at the Meteorological Office, Edinburgh. It was reported that no appointment had yet been made to the Cruickshank lectureship at Aberdeen University. At the request of the Committee the Director has written to the Principal of the University asking for information about the appointment.

The Committee also recorded the gratitude of members for the issue of the Meteorological Magazine, which was considered most valuable for keeping members informed of technical trends and developments.

Mr. E.G. Dymond, who represented the University of Edinburgh on the Committee, died suddenly on 26th October: a successor has not yet been appointed. It is felt that the Committee will wish to place on record its appreciation of the valuable services rendered by Mr. Dymond.

4. The following action has been taken on matters arising out of the Minutes of the last meeting:-

(a) Airmet Broadcasts. As stated by D.M.O. at the last meeting, the Air Ministry, both alone and in collaboration with other Departments, had taken every measure it could think of to secure a suitable broadcasting frequency to permit the re-establishment of Airmet. In view of the recommendation of the Meteorological Committee, efforts are being made to discover a new line of approach to the problem which will offer some prospect of success.

With regard to the Committee's other recommendation that the B.B.C. should be asked to give time for the inclusion of additional two-hourly broadcasts of weather information in one of the daily programmes, the question is being pursued, but we are not yet in a position to report progress.

(b) Teaching and research in meteorology at Universities. In accordance with the decision of the Committee a letter has been sent to the Secretary of the Royal Meteorological Society, inviting the Society to submit its views as to ways of promoting the teaching and study of meteorology at more universities in the United Kingdom. A reply is awaited.

/(c)

To Members of the Meteorological Committee.

(c) Provision of a Canberra aircraft for meteorological research. As recommended by the Committee, the Air Staff representative referred the matter to the Vice-Chief of the Air Staff and it has now been agreed to supply one Canberra aircraft to the Meteorological Research Flight as soon as the supply position permits. It is probable that the aircraft can be made available about June, 1953.

5. It has been agreed that the "copy" for the Observatories Year Book will be prepared in the Meteorological Office by vari-typer and passed to H.M. Stationery Office for production by photolithography. A start is being made with the volume for 1938 which will contain full introductory matter to serve as a source of reference for a number of succeeding volumes.

6. The "Climatological Atlas of the British Isles" was published at the end of August.

7. Volunteer demonstrators from the staff of the Meteorological Office assisted in a series of radio-sonde demonstrations at the Radio Exhibition recently held at Earls Court, London.

8. Under the terms of the Gassiot Trust, the Meteorological Office receives annually from the Royal Society a sum (about £500) towards the cost of maintaining magnetic and meteorological observations and investigations at Kew and Eskdalemuir Observatories. In this connection the Meteorological Office sends to the Royal Society annual reports of the work carried out at these two observatories. Copies of the reports for the year ended 31st March, 1952, are attached for information of members of the Meteorological Committee.

9. Members of the staff of the Meteorological Office attended the following international meetings:-

(a) World Meteorological Organisation.

Executive Committee, held in Geneva, 9th to 27th September, 1952, attended by:-

The Director
Cmdr. C.E.N. Frankcom (part-time)

Commission on Maritime Meteorology, held in London, 14th July to 1st August, 1952, attended by:-

Cmdr. C.E.N. Frankcom (President of the Commission)
Cmdr. J. Hennessey
Mr. R.F.M. Hay
Dr. R. Frith.

(b) Other International Meetings.

Radar Weather Conference, held under the auspices of the Stormy Weather Group, Macdonald Physics Laboratory, McGill University, Montreal, 15th to 17th September, 1952, attended by:-

Mr. R.F. Jones.

Symposium on Forecasting Research, organised by Professor C.G. Rossby at the Institute of Meteorology, University of Stockholm, 13th to 18th October, 1952, attended by:-

Dr. R.C. Sutcliffe.

United Nations Economic and Social Council - International Co-operation on Water Control and Utilization and on the Development of Arid Land, meeting held in London, 25th September to 1st October, 1952, attended by:-

Mr. L.P. Smith (as W.M.O. Observer).

/International

(b) Other International Meetings. (Cont'd.)

International Air Transport Association, Meteorological Group.

3rd Meeting, held in London, 27th October to 1st November, 1952, attended by:-

Mr. J. Durward (part-time)
Mr. J.C. Cumming (part-time)
Mr. M.H. Freeman (part-time).

Yours faithfully,

Williams

Secretary.

MINUTES

METEOROLOGICAL COMMITTEE

One Hundred and Sixty-Eighth Meeting, held in Historic Room 13, 4th Floor, Air Ministry, Whitehall Gardens, S.W.1, at 3 p.m. on 28th May, 1953.

PRESENT:-

Mr. George Ward, M.P. (Chairman)
Under-Secretary of State for Air

Mr. W.J. Bigg (Colonial Office)
Instr.-Captain P. Bracelin (Director, Naval Weather Service)
Mr. I.V.H. Campbell (Air Ministry)
Professor G.M.B. Dobson (Royal Society)
Air Commodore H.R. Graham (Air Ministry)
Professor W.M.H. Greaves (Royal Society of Edinburgh)
Sir Nelson Johnson (Director, Meteorological Office)
Captain J.H. Quick (Ministry of Transport)
Professor P.A. Sheppard (British Universities)
Mr. G.W. Stallibrass (Ministry of Civil Aviation)
Professor O.G. Sutton (Royal Society)
Mr. R.J. Williams (Secretary)

1462. The Chairman apologised to the Committee for the necessity to change, at short notice, the time of the meeting from 11 a.m. to 3 p.m. An Air Council meeting had been arranged for 11 a.m. to discuss arrangements for the Coronation and his attendence at the Air Council meeting had been necessary. He regretted any inconvenience the change might have caused members.

The Chairman reported that apologies for absence had been received from:-

Dr. O.H. Wansbrough-Jones (Ministry of Supply)
Air Marshal Sir Ronald Ivelaw-Chapman, who was represented by Air Commodore H.R. Graham
Major General K.F. Mc.K. Lewis (War Office).

The Chairman extended a warm welcome to Professor P.A. Sheppard and Mr. I.V.H. Campbell as new members of the Committee.

1463. The Minutes of the 167th meeting held on 12th June, 1952, were confirmed.

1464. Action arising out of the 167th Meeting.

(a) The Chairman stated that the most important matter arising out of the Minutes of the last meeting was the proposals put forward by the Royal Meteorological Society in connection with meteorological teaching and research at British Universities. These were contained in the document M.C. -46. The suggestion of seeking the views of the Royal Meteorological Society had come from Professor O.G. Sutton (see Min. 1455), and the Chairman asked Professor Sutton to speak on the memorandum in the first instance.

Professor Sutton stressed the main recommendations of the Council of the Royal Meteorological Society, which are given below:-

1. University teaching of meteorology should be promoted at both the undergraduate and post-graduate levels. The aim should be to spread awareness of the subject through a field much wider than that of the future professional meteorologist, and to awaken the interest of the ablest students at an early stage.

/2.

2. University meteorology should preferably be promoted by establishing posts in meteorological physics within Physics departments rather than by creating separate departments of meteorology at the present stage. This does not, however, imply that professorships are not required.

3. The spontaneous growth of meteorological interests in any university is welcome, but outside influence should be directed towards larger groups at those universities where the subject is already recognised in their staff establishments and courses - specifically at Oxford, Cambridge and Edinburgh.

4. Special grants and scholarships for meteorological research would do much to attract the best students.

5. Facilities for Meteorological Office staff to work at the universities, on special leave with pay, should be available in appropriate cases.

6. Universities should take the whole field of meteorological science as their proper responsibility and should not neglect, in particular, the central problems of atmospheric circulations, weather and climate.

After discussion the Committee agreed to the recommendations in principle subject to examination of their financial implications. It was agreed that a letter should be sent to the Royal Meteorological Society expressing the appreciation of the Committee for their valuable suggestions. It was also agreed that D.M.O., A.U.S.(E.O.) and Professor Sutton should work out the best methods of implementing the recommendations, particularly Nos. 3, 4 and 5. These would then be submitted to the Chairman for his approval and implementation.

(b) With reference to Minute 1457, the Chairman reported that a Canberra jet aircraft had now been allotted to the Meteorological Research Flight, and delivery had been promised for the first week in July.

(c) Mr. W.J. Bigg enquired about the present position of the resumption of AIRMET broadcasts. The Chairman stated that the general position remained unchanged. Unless "user" departments (in particular the Ministry of Civil Aviation and the Ministry of Agriculture and Fisheries) were prepared to say that AIRMET broadcasts were essential and not merely desirable, and until one of the Ministers directly concerned was prepared to press for the matter to be considered at Cabinet level, the Postmaster General could not be expected to allocate a frequency for this purpose.

In the meantime, the suggestion that the British Broadcasting Corporation be asked to include weather information every two hours in their normal broadcasting programme had been examined. Apart from Gale Warnings, which are issued as necessary, weather information is available to listeners eleven times between the hours 0655 and 2215, viz:

0655	Full weather bulletin	Home Service
0755	-do-	-do-
0800	Summary forecast in News	-do-
0900	-do-	Light Programme
1255	Full weather bulletin	Home Service
1300	Summary forecast in News	-do-
1755	Full weather bulletin	-do-
1800	Summary forecast in News	-do-
1900	-do-	Light Programme
2100	Short forecast in News	Home Service
2215 (approx.)	Weather bulletin and forecast	Television Programme.

Discussions were in progress with the B.B.C. for inclusion of an additional full weather bulletin at 2215 in the Light Programme, designed primarily to meet the needs of agriculture and horticulture. The B.B.C. were also examining the possibility of increasing the time allotted for the weather broadcasts from five minutes to ten minutes.

Discussions were also taking place on the possibility of modifying the television procedure to enable the presentation to be given by a meteorologist instead of by a B.B.C. announcer.

Whilst none of these proposed changes was as good as the original AIRMET broadcasts, they would nevertheless represent an appreciable improvement upon existing arrangements.

Professor G.M.B. Dobson stressed that the main value of the AIRMET broadcasts was to the general public and not to the so-called "user" departments. He felt that whilst the Meteorological Office forecasting service was second to none in its technical proficiency, we were not making its results available to the public in the most efficient way. This view was supported by Professors Greaves, Sutton and Sheppard. Reference was also made to the summary forecast prepared by the B.B.C. from the Meteorological Office forecast and broadcast in the News items. It was stressed that this could be done satisfactorily only by a forecaster and steps should be taken to arrange with the B.B.C. for this to be done. It was further proposed that the actual announcing of the weather forecast should be made by a meteorologist and not by a B.B.C. announcer who was not in a position to understand the technical aspects of what he was reading. The adoption of less scientific phraseology should also be considered. Mr. Stallibrass suggested that the most effective way of putting a forecast across to the public was that adopted in America where the forecaster was "interviewed" by an official of the broadcasting company who asked simple questions which revealed the bearing of the forecast on public and private activities.

It was agreed that the Air Ministry should again take up with the B.B.C. the question of allowing the forecaster to read the broadcast weather bulletins and to prepare summaries of weather bulletins required by the B.B.C. for inclusion in their News items.

The suggestion by Mr. Stallibrass of "interviewing" the forecaster should also be examined.

It was agreed to recommend that the Secretary of State should write again to the Postmaster General stressing that the present arrangements were failing to bring the public benefits which they had a right to expect from the state meteorological service, and asking the Postmaster General to examine once again the possibility of providing a frequency for this purpose.

1465. Membership.

The Chairman announced that since the last meeting the following changes had taken place in the membership of the Meteorological Committee:-

(a) Professor P.A. Sheppard had replaced Sir David Brunt as the representative of the British Universities.

(b) Mr. I.V.H. Campbell had replaced Mr. W.B. Foden (Air Ministry).

(c) Air Marshal Sir Ronald Ivelaw-Chapman had succeeded Air Chief Marshal Sir Ralph Cochrane as the representative of the Air Staff.

(d) Dr. O.H. Wansbrough-Jones had replaced Sir Harry Garner as the representative of the Ministry of Supply.

The Chairman also reported the following changes in the membership of the Advisory Committee on Meteorology for Scotland:-

(a) Mr. J. Paton had succeeded Sir Ernest Wedderburn, who had resigned, as the representative of the Royal Society of Edinburgh.

(b) Sir Charles Normand had replaced Mr. J. Paton as the representative of the Royal Meteorological Society.

(c) A vacancy existed in the representation for the University of Edinburgh following the death of Mr. E.G. Dymond in October, 1952

/1466.

1466. Appointment of Senior Officers in the Meteorological Office.

The Chairman announced that Sir Nelson Johnson would be retiring from his post as Director of the Meteorological Office in September and would be succeeded by Professor O.G. Sutton. Sir Nelson joined the Meteorological Office, in 1919 after four years in the Royal Flying Corps, and set off on a distinguished career marked out by rapid promotion which, after a period of ten years with the Chemical Defence Research Department of the War Office, brought him to the post of Director of the Meteorological Office in 1938. When he retired this year he would have spent some fifteen years in charge of the Meteorological Office, and since the war had presided over the International Meteorological Committee and, in 1951, over the World Meteorological Organisation. The Chairman was sure that the Committee would wish to set on record their great appreciation of Sir Nelson's services to the cause of meteorology.

The Chairman also announced the retirements of Dr. A.H.R. Goldie and Mr. E.G. Bilham, Deputy Directors for Research and Forecasting respectively. Following recommendations of the sub-committee of the Meteorological Committee, he had approved the promotion of Mr. S.P. Peters and Dr. R.C. Sutcliffe to the grade of Deputy Chief Scientific Officer to fill initially the posts of Deputy Directors for Forecasting and Research respectively.

1467. Annual Report of the Director of the Meteorological Office for the year April, 1, 1952, to March 31, 1953.

The Chairman invited the Committee to consider the Annual Report of the Director of the Meteorological Office for the year April, 1, 1952, to March 31, 1953. (M.C. -40).

At the request of the Chairman, the Director drew attention to items of special interest in the Report. These included:-

(a) Section 2(1)(e). - Radio-sonde and radar-wind stations. - For the past few years work has proceeded on the development of a radar-sonde. A site for the initial ground station was selected at Pease Pottage, near Crawley in Sussex. Building commenced in July, 1952 and was virtually completed by January 1953, when the equipment was installed and tests were started. This is the first radar-sonde station to be established in this country. Values of pressure, temperature and humidity and wind will be recorded automatically in the form of graphs or teleprinter copy, and the accuracy of telemetering is of the order of one part in a thousand.

(b) Section 2(4)(f). - Special work. - Following the accident to the Aer Lingus aircraft near Snowdon on January 10, 1952, steps have been taken to extend the investigation of large scale turbulence caused by mountains.

(c) Section 3(1)(d). - Publications. - The Climatological Atlas of the British Isles, comprising 52 pages of text and 56 pages of maps and diagrams, was published in August, 1952.

(d) Section 3(1)(f). - Special work - Hydrology. (See also Section 2(2)(b) River Boards, etc.).

Following the disastrous East Coast floods on 31st January and 1st February, 1953, the Meteorological Office provided special weather warning services for the River Boards in accordance with recommendations made by the Home Office Flood Warning Sub-Committee. These emergency weather warning services were extended to cover the February and March spring tide periods. An investigation of the meteorological factors associated with the floods is being made, and the Meteorological Office is collaborating with the Inter-departmental Committe set up by the Cabinet under the Chairmanship of Lord Waverley to examine the whole question.

The Committee asked that the gist of this statement should be included in the Report under "Hydrology" in Section 3(e) Special Work.

(e) Section 4(b). - Special investigations. - Much attention has been paid to the meteorological problems connected with the operation of Comet jet aircraft. A Principal Scientific Officer of the Meteorological Office had also been seconded to the British Overseas Airways Corporation for the last three years to assist in the meteorological planning on the Comet routes.

The undermentioned points were raised by members:-

(i) Section 2(4)(f). - Special work. - Mr. Stallibrass enquired whether the new procedure under the Crown Proceedings Act by which Meteorological Office staff were required to give evidence at Public Inquiries into aircraft accidents had caused forecasters to exercise excessive caution in their forecasts. The Director stated that he had no evidence of this, and Mr. Campbell stated that agreement had been reached with the Staff Side to ensure that where necessary staff were adequately represented at such Inquiries.

(ii) Section 3(1)(e). - Special work. - Mr. Bigg enquired whether meteorological observations at the Radcliffe Observatory, Oxford, were still being made. The Director stated that they had now ceased. (Added later: At present observations are being made at the School of Geography. This site has also proved unsatisfactory, and search is being continued for a better site.)

(iii) Section 4(2)(a) - General instruments. - Mr. Stallibrass asked that the statement in the second paragraph of this sub-section that "following a change of policy" work had been suspended on the development of methods of measuring ground-to-air "slant" visibility should be changed to read "following a change of approach".

(iv) Professor Sheppard suggested that future Reports should contain a summary, or preferably an index. The Director undertook to examine this point.

1468. Annual Report of the Director of the Naval Weather Service, 1st April, 1952, to 31st March, 1953.

The Chairman drew the attention of the Committee to the Annual Report of the Director of the Naval Weather Service for the year 1st April, 1952, to 31st March, 1953. (M.C. -41).

Instructor-Captain Bracelin referred to the following items in the Report:-

(a) During the year the Admiralty Forecast Section had received many requests for special forecasts, in addition to routine forecasts. These special forecasts had covered such operations as the towing from Murmansk to the United Kingdom of ships loaned to the U.S.S.R. during the war, the dismantling of Thames Estuary Forts, operations of Fishery Protection Vessels and operations by the Rhine Squadron when assisting the Dutch Authorities following the Flood Disaster.

/(b)

(b) Introductory trials of meteorological facsimile equipment into the Service had been carried out and were continuing.

(c) The development by the Meteorological Office of a light-weight radio-sonde for gunnery purposes had reached a stage where ship's trials were desirable and arrangements had been made for sea trials to be carried out in H.M.S. Cumberland.

The Chairman thanked the Director of the Naval Weather Service for his Annual Report, which was noted with interest by the Committee.

1469. Report of the Meteorological Research Committee to the Secretary of State for Air for the year ended 31st March, 1953.

The Chairman referred to the Report of the Meteorological Research Committee for the year ended 31st March, 1953, which had been submitted to the Secretary of State for Air. (M.C. -42)

The Chairman asked Professor Sheppard to summarise the instrumental investigations carried out in the past year, and Professor Sutton to do the same in regard to the physical investigations. The Director summarised the work of the Synoptic and Dynamical Sub-Committee.

The Committee noted the Report of the Meteorological Research Committee and the progress that had been made as indicated by the statements made by Professor Sheppard, Professor Sutton and the Director.

1470. Annual Report of the Meteorological Committee to the Secretary of State for Air for the period 1st July, 1952, to 30th June, 1953.

The Chairman invited the Committee to consider, and amend as necessary, the draft Annual Report of the Meteorological Committee to the Secretary of State for Air for the period 1st July, 1952, to 30th June, 1953 (M.C. -43).

The Committee approved the draft Annual Report subject to the following amendments:-

(a) insertion of the following as paragraph 4 :-

"Two of the Deputy Directors, Dr. A.H.R. Goldie and Mr. E.G. Bilham, have also retired recently at the ages of 64 and 61. A sub-committee of the Meteorological Committee has recommended the promotion of Mr. S.P. Peters and Dr. R.C. Sutcliffe to the grade of Deputy Chief Scientific Officer to fill the resulting vacancies in that grade. As Chairman of the Meteorological Committee I have approved these recommendations."

(b) insertion of a new paragraph immediately after paragraph 5 of M.C. -43 as follows:-

"AIRMET Broadcasts. - Strong representations have been made by many members of the Committee that, whilst the Meteorological Office forecasting service is second to none in its technical proficiency, the results are not presented to the public in a satisfactory way through the medium of the B.B.C. sound and television channels. The Committee note that arrangements now under discussion with the B.B.C. and approve the measures which are being taken to secure the allocation of more time for weather bulletins and urge that the proposals should also include the reading and summarising of the official forecasts by meteorologists instead of by B.B.C. announcers. Other means of assisting the public in the better understanding of weather forecasts should be pursued."

The Committee also recommends that the question of the re-establishment of AIRMET, or an equivalent channel of communication to the public, should be referred again to the Postmaster General.

(c) addition of the following to paragraph 6 :

"The Committee received a memorandum from the Royal Meteorological Society presenting the views of the Council of the Society on the subject. This memorandum was considered and the recommendations of the Royal Meteorological Society were approved in principle. The Director of the Meteorological Office, the Assistant Under Secretary (Establishments and Organisation) and Professor Sutton were asked by the Committee to study further the Society's recommendations with a view to their implementation.

(d) insertion at the end of paragraph 7 of "(See para. 6 above)".

(e) substitution in paragraph 10 or "Royal Air Force requirements" by "the requirements of the Services and civil aviation".

(f) Professor Sutton asked for the inclusion at the end of paragraph 11 of a reference to the work being carried out under the Atmospheric Pollution Research Committee on the cause of exceptionally severe fogs.

(g) amend paragraph 13 to agree with Minute 1465 above.

1471. Annual Reports for Kew and Eskdalemuir Observatories for submission to the Gassiot Committee of the Royal Society.

The Chairman asked the Committee to consider the Annual Reports on the work carried out at Kew and Eskdalemuir Observatories during the year 1st April, 1952, to 31st March, 1953 (M.C. -44, Appendices I and II) which had been submitted to the Committee for approval before being transmitted to the Royal Society for circulation to members of the Gassiot Committee.

The Committee noted and approved the Reports.

1472. International Meetings

The Committee noted the activities of the Meteorological Office in the field of international meteorology as shown in the paper M.C. -45. The importance of this work was agreed.

1473. Date of Next Meeting

The Chairman suggested that, following the usual practice, the date of the next meeting of the Committee should be left open. This was agreed.

1474. The Committee rose at 5.10 p.

M.C. - 40

METEOROLOGICAL COMMITTEE

Annual Report
of the Director of the
Meteorological Office
presented by the Meteorological Committee
to the Secretary of State for Air
for the year
April 1st 1952 to March 31st 1953.

The Annual Report which was previously circulated in proof stage was accepted, subject to amendments, by the Committee - see Minute 1467.

ANNUAL REPORT

# of the

Director Naval Weather Service

1st April 1952 to 31st March 1953

for Members of the Meteorological Committee

Section A.	GENERAL
B.	TRAINING
C.	WEATHER MESSAGE ORGANISATION
D.	PUBLICATIONS AND CLIMATOLOGY
E.	INSTRUMENTS AND EQUIPMENT
F.	INVESTIGATIONS

SECTION A - GENERAL

1. Liaison with Other Services. Close liaison has been maintained with all departments of the Air Ministry Meteorological Office; and on overseas stations with other Meteorological Services through the appropriate Fleet Meteorological Officers.

2. General Organisation

(a) Home Station

(i) Admiralty Forecast Section

The Admiralty Forecast Section continues to meet the requirements of H.M.Ships in Home Waters by the issue of thrice daily Fleet Synoptic Messages (suitable for use in ships with part-time meteorological organisations), twice daily Analysis Messages, twice daily Fleet Forecast Messages and in conjunction with the Meteorological Office, Air Ministry, Gale and Upper Wind Warnings. The contents of the messages, are constantly under review to ensure that units of the Fleet obtain the best available coverage in the areas in which they are operating. During the arctic cruise of the Home Fleet the focus of the messages was moved to the north-westwards at the expense of southern areas. All available upper air reports from Iceland, Greenland, Thorsavn, Jan Mayen and the northern weather ships were included and surface reports for intermediate synoptic hours from a selected number of stations in the vicinity of the Fleet were transmitted in addition to the full coverage for the main synoptic hours. The Fleet Analysis and Forecast Messages were also extended as necessary to cover the movements of units in Home Waters.

During Exercise "Mainbrace" the coverage of the Fleet Snyoptic Messages was much increased, three analyses and two prognostic analyses per day were produced and forecasts for the areas in which the exercise was taking place were added to those usually given in the fleet forecast messages. Gale warnings for the additional areas were issued as necessary.

During the year many requests have been received for special forecasts, in addition to the routine forecasts. These special forecasts have been mainly for coastal towns but have also covered, amongst others, such operations as the towing from Murmansk to the United Kingdom of ships loaned to the U.S.S.R. during the war, the dismantling of Thames Estuary Forts, operations of Fishery Protection Vessels and operations by the Rhine Squadron when assisting the Dutch Authorities following the Flood Disaster. Signals have been received from several authorities commenting favourably on the accuracy of the forecasts supplied and on their value in planning.

Aviation forecasts for the route Gibraltar to Hendon continue to be supplied twice weekly to U.S. Naval Authorities.

(ii) Home Air Command

Meteorological Services for the Home Air Command continue to function around the three group centres at Culdrose, Abbotsinch and Lee-on-Solent. These three centres and all other Home Air Command naval air Stations receive basic meteorological data directly on the Channel 1 Dunstable teleprinter broadcast. In addition each of the three group centres receives hourly actuals and terminal forecasts from its satellites; collective messages are exchanged between centres, and are broadcast from each centre to satellites. A rapidly increasing amount of high altitude flying by jet aircraft has necessitated an increased attention to upper air charts by the group centres.

(iii) Home General

Experience has shown the need for rapid supply by Naval air stations of current information and forecasts of surface and upper air conditions to carriers operating in Home waters.

(b) Mediterranean

At the request of the Air Ministry Meteorological Office, the Fleet Weather Centre, Hal Far, has made arrangements to provide forecast messages for merchant shipping in the Mediterranean to be broadcast by civilian contractors in Malta. The arrangement, originally temporary, whereby the Fleet Meteorological Office at Lascaris was moved to Hal Far continues to be the most satisfactory. A briefing office for the Commander-in-Chief and staff remains at Lascaris.

(c) Far East

The Fleet Weather Messages continue to be prepared at the Kallang meteorological office with naval ratings attached for the assistance required. Ships in the Korean theatre rely on the Guam and Tokio broadcast for the bulk of basic data. Local forecasts, storm warnings and limited synoptic information are also prepared at Hong Kong where a naval meteorological officer is borne for the purpose.

3. Turbulence Reports.

Reports of severe turbulence experienced by naval aircraft have from time to time been forwarded to the Air Ministry meteorological office where research into this phenomenon is being carried out.

4. Naval Weather Service Handbook

The Naval Weather Service Handbook, prepared at the Naval Weather Service Department, Admiralty, is now at the printers.

5. Naval Weather Service News Letter.

A Naval Weather Service News Letter is issued every six months. It contains items of interest to all meteorological officers regarding general organisation at home and overseas and advances in research and development. The letter is distributed not only to active service meteorological officers but also to those on the permanent list of the R.N.V.R. to keep them in close touch with current meteorological activities affecting the Service.

6. Facsimile Transmissions of Meteorological Data.

Close liaison with Director Signals Department and Director Electrical Engineering has been maintained over introductory trials of meteorological facsimile equipment into the Service.

/Section

SECTION B - TRAINING.

7. The meteorological courses for officers and ratings continue to be carried out in H.M.S. HARRIER.

(a) Officers' Qualifying Course

Before joining H.M.S. HARRIER Officers carry out one week's meteorological training at a Royal Naval Air Station.

The instruction at H.M.S. HARRIER is divided into two parts. Part I, lasting 12 weeks, is of general instruction in meteorology, while Part II is seven weeks specialised instruction in the application of meteorology to Naval Aviation. A week is spent at a Royal Naval Air Station between Parts I and II. A final week of practical training at a Royal Naval Air Station is arranged on completion of the course before taking up an appointment.

(b) Ratings' Courses

On completion of the qualifying courses in H.M.S. HARRIER, new entry ratings are rated Meteorological Observer 3. Advancement to Meteorological Observer 2 and 1 is dependent upon recommendation and the passing of the appropriate professional examination.

8. Miscellaneous Training

(a) R.N.V.R.(Officers)

Officers of the Special and Instructor Branches completed periods of training in meteorological offices ashore and afloat during the year.

Officers of the Naval Weather Service Department have given evening lectures to Meteorological Officers of the London Division of the R.N.V.R. in H.M.S. PRESIDENT. Lectures have been given on the average about one each month throughout the winter.

Meteorological Officers are attached to certain R.N.V.R. squadrons and undertake week-end duties and annual training period duties with these squadrons. One such meteorological officer was borne with the R.N.V.R. squadron which visited Malta for annual summer training in 1952.

(b) R.N.V.R. Ratings

A few Naval Airmen Meteorological Observers are attached to the R.N.V.R. Air Squadrons and carry out week-end and annual training duties in the meteorological office of the parent air station.

SECTION C - WEATHER MESSAGE ORGANISATION

9. Transmission of Weather Information to H.M.Ships in Peace

The organisation for the supply of basic weather information at Home and Overseas is under constant review to ensure that the needs of H.M.Ships and Establishments are being adequately met.

H.M. Ships with full time meteorological organisations (i.e., carriers and Fleet flagships) read the appropriate International Meteorological broadcast, and in addition, the Fleet Synoptic and Analysis messages on those stations where such a service exists. Ships with a part-time organisation read the Fleet Synoptic and Analysis messages only. For small ships with no qualified meteorological officer there exists the Fleet Forecast Messages, except on the American and West Indies Station where H.M. Ships are required to read U.S. and Canadian broadcasts for their weather information.

A feature of the year has been the gradual introduction of Radio Teletype and Facsimile Broadcasts by the U.S., e.g., the American Guam broadcast which formerly broadcast all weather messages on C.W. now only broadcasts plain language forecasts, gale and storm warnings, and analyses on C.W., the whole of surface and upper air data basic data now being on R.T.T. transmissions.

Details of all meteorological broadcasts likely to be required by H.M.Ships are listed in H.D.373(W.7) or in Admiralty List of Radio Signals, Volume III, Part A.

10. Home Station

On the Home Station the needs of the Fleet have been met by the Air Ministry broadcasts from Dunstable and Rugby, and the Fleet Weather broadcasts from Whitehall. The latter are essential for ships with only part-time meteorological organisations and provide selected data for the areas in which Home Fleet units are operating.

To facilitate the provision of data by naval air stations to carriers operating in Home Waters mentioned in Section A, a FOUWT code (Forecast of Upper Wind and Temperatures) has been drawn up and has been promulgated in H.D.373 (W.7) and A.L.R.S., Vol. III, Part A.

11. Mediterranean

The Fleet weather broadcasts, consisting of two forecast messages, three synoptic messages, two surface and one upper air analyses per day, have been maintained throughout the year.

The synoptic and analyses messages are carried on the Administrative broadcast. The forecast messages are transmitted on the Ship broadcast, but when traffic permits the analyses are also repeated on the latter.

The plain language forecasts are now also broadcast on commercial waves for the benefit of merchant shipping. The cost of this is to be borne by the Meteorological Office (Air Ministry).

12. Far East

The number of naval airmen (meteorological observer) attached to the Malayan Meteorological Service at Kallang for assistance in preparation of the Fleet Weather Messages has been reduced to two.

Typhoon warnings, forecasts and data for the South China Seas areas continue to be prepared at the Royal Observatory, Hong Kong. One naval meteorological officer is attached to the Observatory.

13. E. Indies, S.Atlantic, and American and W.Indies Stations.

Except for the Fleet Weather centre at Simonstown, which is under care and maintenance, no shore meteorological establishments exist on these stations. The Meteorological requirements of the E.Indies and S.Atlantic are met by rebroadcast of suitable information provided by arrangement with local civilian services, on naval waves.

On the America and West Indies Station, no rebroadcast facilities are available and U.S. and Canadian meteorological broadcasts are read by H.M. Ships.

SECTION D - PUBLICATIONS AND CLIMATOLOGY.

14. Publications

(a) N.W.S. Memoranda and Circulars

The following have been printed and issued:-

N.W.S.Memo: 144/50	Multiple frontal Analysis
N.W.S.Memo: 145/51	Forecasting for high-flying aircraft.
N.W.S.Memo: 148/52	Notes on Upper Air Charts
N.W.S.Memo: 149/53	Computation of Upper Winds from balloon ascents at sea.
N.W.S.Circular 13/52	Synoptic Weather sequences for the Southern Oceans
N.W.S. Circular 14/52	Analysed Weather sequences for the Southern Oceans
N.W.S.Circular 15/52	Notes on jet-streams and turbulence at High levels

(b) Sailing Directions and Weather Handbooks.

(i) The meteorological, currents and ice texts of the following Admiralty Pilots, have been revised in conjunction with the Meteorological Office, Air Ministry:-

China Pilot	Vol.III
Norway Pilot	Vol.III
Newfoundland Pilot	Vol.II
Baltic Pilot	Vol.II
Africa Pilot	Vol.I
E.Archipelago Pilot	Vol.IV

(ii) The revision of the four volumes of the handbook "Weather on the Mediterranean Station" is expected to be completed and published by the end of the year.

/(iii)

(ii) The "Atlas of monthly meteorological charts of the Greenland and Barents Seas" has been completed and will be issued shortly.

(c) Miscellaneous publications.

The following new publications, all of Meteorological Office, Air Ministry origin, have also been issued:-

M.O.479	Condensation Trails from aircraft.
M.O.480	Condensation Trails - Notes for the use of Pilots
M.O.488	Climatological Atlas of the British Isles.
M.O.535d	Ice Accretion on Aircraft
M.O.554	Observers Handbook
M.O.555	Upper Air Data for Larkhill and Lerwick.

15. Climatology.

(a) During the year forty-five climatological appreciations, reports and answers have been prepared for the Naval Staff, Admiralty Departments and other Naval authorities.

(b) Temperature statistics of British bases abroad have been completed for the R.N.Personnel Research Committee.

SECTION E - INSTRUMENTS AND EQUIPMENT

16. General

Close attention has been paid throughout the year to the problems of supply maintenance and establishments of meteorological equipment for H.M.Ships and R.N.Air Stations. Meteorological office layouts have been planned for new construction and ships refitting and subsequent inspections of these offices have been carried out. Advice on various aspects of meteorological equipment has been given to ships and shore establishments and to Admiralty departments. A successful liaison has been maintained with the Meteorological Office, Air Ministry and with commercial firms, particularly in regard to the development of new meteorological instruments and the loan of special instruments for various trials.

/17

17. Facsimile

A standard 18" facsimile recorder is now in production and two models have been ordered for installation in H.M.S. VANGUARD and H.M.S. EAGLE. Arrangements are in hand for full scale trials of facsimile transmission of meteorological data from the Forecast Section Admiralty.

18. Temperature and Humidity Measurements in the Lower Atmosphere.

Trials of the portable distant-reading electrical psychrometer which can be hoisted up to the masthead to obtain wet and dry bulb air temperatures and so assist in the forecasting of radar propagation conditions, have been continued in H.M.S. EAGLE. A preliminary report shows that no definite conclusions can yet be drawn about the value of this instrument or method.

19. Helicopter Instruments

The installation of an aircraft electrical psychrometer in a helicopter for the same purpose mentioned in 18 above has been inspected and approved subject to the fitting of an additional radiation shield.

20. Hydrogen Generator.

Further progress has been made in the development of a high pressure hydrogen generator. A second stainless steel model is being built, and the production of hydrogen from the pellets has been improved by 20%.

21. Hand Aspirated Psychrometer

Seven of the new hand aspirated psychrometers have been received from the Meteorological Office and forwarded to carriers in commission for extensive sea trials.

22. Disappearance Range Gauge

Seven models of a disappearance range gauge were acquired from the Admiralty Research Laboratory and forwarded to carriers in commission to assist in the determination of visibility at sea.

23. Pilot Balloon Explosion

As a result of a hydrogen explosion which occurred during the filling of a balloon fitted with a nylon reflecting cover in H.M.S. BIRMINGHAM, a further investigation is being undertaken to discover if additional precautions are necessary in the handling of hydrogen in ships.

24. Light-Weight Radiosonde

The development of this instrument for gunnery purposes by the Meteorological Office, Air Ministry has reached a stage where ships' trials are desirable and arrangements are now being made for sea trials to be carried out in H.M.S. CUMBERLAND during the next trials period.

25. True Wind Equipment

Experience has shown that the present types of electrical true wind resolvers in H.M.Ships are unreliable and difficult to maintain. At a recent meeting of user departments at which Director of Naval Weather Service was represented it was decided to remove true wind equipment from H.M.Ships and to suspend all development work.

/26

26. Shipboard Screen

Trials were carried out to determine whether the use of luminous paint would assist in the reading of thermometers in the shipboard screen under "darken ship" conditions, but it was found to be impracticable. The amount of illumination available was found to be more apparent than real.

27. Instructional Film Strip

A new Air Ministry film strip entitled "High Altitude Meteorology" has been acquired for training purposes.

SECTION F - INVESTIGATIONS

28. Director of Naval Weather Service was represented on the Meteorological Research Committee and its three sub-committees. During the year 12 meetings have been held and 66 papers discussed.

29. The accumulation on Hollerith Cards of data from Naval Air Stations in the United Kingdom continues. An analysis of the relation between visibility and wind speed and direction for Lee-on-Solent has been completed.

30. A Memorandum on "Observing, Forecasting and Reporting Ocean Waves and Surf" has been published.

31. (a) Two papers on Ballistic Temperature have been written and distributed to appropriate Admiralty Departments.

(b) A paper entitled "The Variation of Humidity with Height over the Ocean" was published by the Meteorological Research Committee.

32. A Memorandum entitled "Estimation of Ballistic Temperatures at Sea" will be published shortly.

33. A paper entitled "High Altitude Winds over Ocean Weather Ship 'MIKE' " will shortly be submitted to the Meteorological Research Committee.

34. Technical advice on a number of subjects has been given to Divisions of the Naval Staff and Admiralty Departments.

35. Director of Naval Weather Service has been represented on the Tropospheri Wave Propagation Committee.

36. One meeting of the Admiralty Radio Meteorological Committee has been held during the year.

M. C. - 42

METEOROLOGICAL COMMITTEE

Report of the Meteorological Research Committee
to the
Secretary of State for Air
for the year ended 31st March, 1953.

The Report of the Meteorological Research Committee (M.R.P. 787A) which was previously circulated was noted by the Committee - see Minute 1469.

METEOROLOGICAL COMMITTEE

AIR MINISTRY

Annual Report of the Meteorological Committee to the Secretary of State for Air for the period 1st July, 1952, to 30th June, 1953

1. The Meteorological Committee met on 28th May, 1953. The meeting due to be held in November, 1952, was not convened as there were no matters requiring discussion at a formal meeting. Information which it was necessary to bring to the attention of the Committee was communicated by letter.

2. Membership. The following changes have taken place in the membership during the year:-

Dr. O.H. Wansborough-Jones, C.B., O.B.E., has succeeded Sir Harry Garner, K.B.E., C.B., as the representative of the Ministry of Supply.

Professor P.A. Sheppard has been appointed to succeed Sir David Brunt as the representative of the British Universities.

Air Marshal Sir Ronald Ivelaw-Chapman, K.C.B., K.B.E., D.F.C., A.F.C., has succeeded Sir Ralph Cochrane, G.B.E., K.C.B., A.F.C., as the representative of the Air Staff.

Mr. I.V.H. Campbell, C.B., has succeeded Mr. W.B. Foden, C.B., as the representative of the Permanent Under Secretary of State for Air.

3. Appointment of Director. Professor O.G. Sutton, C.B.E, D.Sc., F.R.S., Dean of the Royal Military College of Science, Shrivenham, and Bashforth Professor of Mathematical Physics, has been appointed to be Director of the Meteorological Office in succession to Sir Nelson Johnson, K.C.B., when the latter retires in September next.

4. Appointment of Senior Officers in the Meteorological Office. Two of the Deputy Directors, Dr. A.H.R. Goldie and Mr. E.G. Bilham, have retired recently at the ages of 64 and 61. A sub-committee of the Meteorological Committee has recommended the promotion of Mr. S.P. Peters and Dr. R.C. Sutcliffe to the grade of Deputy Chief Scientific Officer to fill the resulting vacancies in that grade. As Chairman of the Meteorological Committee I have approved these recommendations.

5. Annual Report of the Director of the Meteorological Office. The Committee received the Annual Report of the Director of the Meteorological Office for the year 1st April, 1952, to 31st March, 1953, and presented it (after amendment) to the Secretary of State for Air.

6. AIRMET Broadcasts. Strong representations have been made by many members of the Committee that, whilst the Meteorological Office forecasting service is second to none in its technical proficiency, the results are not presented to the public in a satisfactory way through the medium of the B.B.C. sound and television channels. The Committee note that arrangements now under discussion with the B.B.C. and approve the measures which are being taken to secure the allocation of more time for weather bulletins and urge that the proposals should also include the reading and summarising of the official forecasts by meteorologists instead of by B.B.C. announcers. Other means of assisting the public in the better understanding of weather forecasts should be pursued.

The Committee also recommends that the question of the re-establishment of AIRMET, or an equivalent channel of communication to the public, should be referred again to the Postmaster General.

/7.

7. Teaching and Research in Meteorology at British Universities. As instructed at the 1952 meeting of the Committee the Secretary wrote to the Royal Meteorological Society to ascertain their views as to ways of promoting the teaching and study of meteorology at more universities in the United Kingdom. (See para. 10 in last year's Annual Report).

The Committee received a memorandum from the Royal Meteorological Society presenting the views of the Council of the Society on the subject. This memorandum was considered and the recommendations of the Royal Meteorological Society were approved in principle. The Director of the Meteorological Office, the Assistant Under Secretary (Establishments and Organisation) and Professor Sutton were asked by the Committee to study further the Society's recommendations with a view to their implementation.

8. Staffing of the Meteorological Office. The Committee noted that strengths were not up to establishment, due, in part, to difficulties in recruiting in the scientific and experimental grades and in part to overall manpower limitations.

As was envisaged last year, the available staff has been distributed more or less equally over most of the "users", and care has been taken to ensure that the research divisions have not been depleted to enable demands from the operational side, which in many cases have been pressing, to be met. Possible ways of modifying the organisation with a view to the most effective use of the staff available are constantly being studied.

Only four new Scientific Officers have been engaged during the year, but steps have already been taken to improve the position. (See para. 7 above).

9. Vacation Students. Applications for attachment to the Meteorological Office during the 1952 summer vacation were received from 30 students at 16 universities. From these 30 students 12 were selected for attachment to various research establishments in the Meteorological Office.

10. Meteorological Research. The Committee took note of the Report of the Meteorological Research Committee for the year ended 31st March, 1953. The Committee was pleased to note that the staff of the research divisions of the Meteorological Office had not suffered undue depletions. (See para. 8 above). The Committee wished to stress the importance of keeping the knowledge of upper air conditions ahead of the requirements of the Services and Civil Aviation in view of the continual increase in operating heights as new types of aircraft come into use and notes that a Canberra aircraft will be allotted to the Meteorological Research Flight during the summer of 1953.

The Committee noted the general state of the investigations which are being carried out under the guidance of the Meteorological Research Committee.

11. Following the disastrous East Coast floods on 31st January and 1st February, 1953, the Meteorological Office provided special weather warning services for the River Boards in accordance with recommendations made by the Home Office Flood Warning Sub-Committee. These emergency weather warning services were extended to cover the February and March spring tide periods. An investigation of the meteorological factors associated with the floods is being made, and the Meteorological Office is collaborating with the Inter-departmental Committee set up by the Cabinet under the Chairmanship of Lord Waverley to examine the whole questio

12. Assistance was given in a special investigation carried out by the Atmospheric Pollution Research Committee of the Department of Scientific and Industrial Research into the causes and constituents of exceptionally severe fogs. The investigation will provide detailed information to assist medical authorities to determine which constituents of atmospheric pollution are primarily responsible for detrimental effects on health, particularly effects of foggy weather such as experienced during the period 5th to 9th December, 1952.

/13.

13. Report of the Director of the Naval Weather Service. The Committee received and took note of the abridged Report of the Director of the Naval Weather Service, Admiralty, for the year 1st April, 1952, to 31st March, 1953.

14. The Advisory Committee on Meteorology for Scotland met on 11th June, 1953, at the Meteorological Office, Edinburgh. The following changes have taken place in the membership during the year:-

Mr. J. Paton has succeeded Sir Ernest Wedderburn, who has resigned, as the representative of the Royal Society of Edinburgh.

Sir Charles Normand has replaced Mr. J. Paton as the representative of the Royal Meteorological Society.

A vacancy exists in the representation for the University of Edinburgh following the death of Mr. E.G. Dymond in October, 1952.

15. International Meteorology. The Committee noted the activities of the Meteorological Office in the field of international meteorology during the year.

(Sgd.) GEORGE WARD
Chairman

5th September, 1953.

G.376822/JWP/9/53/60.

METEOROLOGICAL COMMITTEE

AIR MINISTRY

Annual Reports for Kew and Eskdalemuir Observatories for submission to the Gassiot Committee of the Royal Society

1. The Air Ministry receives annually from the Royal Society the income of the Gassiot Fund for the use of the Meteorological Office. This Fund was established by John P. Gassiot, F.R.S. in 1871 "to assist in carrying on and continuing magnetical and meteorological observations with self-recording instruments and any other physical investigations that may be practicable and desirable at Kew Observatory". The Fund is administered by the Gassiot Committee. The amount received in 1952 was just under £600.

2. In this connection, the Meteorological Office sends to the Royal Society, for circulation to members of the Gassiot Committee, annual reports on the work carried out at Kew and Eskdalemuir Observatories. (The magnetic work formerly done at Kew Observatory is now carried out at Eskdalemuir Observatory). Copies of the reports sent to the Royal Society for the year ended 31st March, 1952 were attached to the Secretary's circular letter dated 11th December, 1952 for the information of members of the Meteorological Committee.

3. The reports for the year ended 31st March, 1953 are attached at Appendix I (Kew Observatory) and Appendix II (Eskdalemuir Observatory) for approval by the Meteorological Committee.

N.K. JOHNSON
Director

Meteorological Office,
Air Ministry, London, W.C.2.
May, 1953

Gev.366351/JT/4/53/75

Air Ministry, Meteorological Office

KEW OBSERVATORY

Annual Report for the year 1st April, 1952 to 31st March, 1953

1. Meteorological Observations and Records

Autographic records of atmospheric pressure, dry and wet bulb temperature, wind, rainfall, sunshine and evaporation, together with standard measurement or observation of certain of these elements and of grass minimum and earth temperature, cloud, visibility and weather, were maintained according to normal procedure. A night sky recorder remained in operation. Records of atmospheric pollution were obtained from an Owens automatic filter and from a D.S.I.R. smoke filter.

Tabulations were prepared for the Observatories' Year Book and other official publications. To meet the needs of many inquiries it was found convenient to distribute a weekly statement of observations.

Details of the routine observations made at the Observatory are given in the Appendix to the Annual Report for 1951 - 52.

2. Measurement of Solar Radiation

Recording continued of solar intensity at normal incidence, of total and diffuse radiation on a horizontal surface and of the natural illumination of a horizontal surface. The properties of the recording photometer of the illumination instrument were investigated and various corrections were applied to the tabulated results. The corrected record, which has an unexpectedly high degree of internal consistency, is being analysed to determine the mean visual albedo of the atmosphere and of clouds. Progress was made with the analysis, mentioned in the last Report, of the other radiation records.

Work continued on the modified bimetallic actinograph. A model which has been made performs satisfactorily in the laboratory and on short field trials but further test is required in an extended field trial.

In anticipation of an increased requirement for the calibration of radiometers, the calibration procedure is being standardized as far as possible with the object of economy of staff time.

A paper on the comparison of pyrheliometers was published by the Royal Meteorological Society.

3. Atmospheric Electricity

Continuous photographic records of the electrical potential gradient were obtained. Measurements of the potential gradient and the air-earth current were made on suitable days.

4. Seismology

The Galitzin seismographs (two horizontal components and one vertical component) and the short-period vertical component seismograph gave satisfactory records. The Seismological Bulletin issued monthly included the analysis of 470 earthquakes, the epicentres of 90 being determined. A very large earthquake in Kamchatka on November 4th, 1952 was notable for an unusual number of aftershocks, most of which are not included in the figures given above. Copies of seismograms were supplied at the request of several observatories in other countries.

The International Seismological Summary staff, lately increased, continued to be accommodated in the Observatory.

/5.

5. Other Investigations

Further study was made of short-period fluctuations of wind and temperature near the ground. Evaluation of records taken at heights between one and two metres confirmed the anomalous values of the vertical flux of heat previously found at lower heights. Apparatus capable of detecting more rapid fluctuations has been built, and its characteristics have been investigated in the laboratory. Field recordings with this apparatus will be made in the near future. Analysis of the energy-frequency relation in the horizontal and vertical components of the wind fluctuations has given encouraging first results. A paper on the earlier part of the fluctuations investigation was communicated to the Meteorological Research Committee.

A modified form of the aspirated radiation balance meter developed by Gier and Dunkle, University of California, has been made and will be used, along with other special apparatus, to investigate the heat balance at the ground.

6. Miscellaneous

Advice was given to departments of the Ministry of Supply concerning the recording of radiation during tropical trials of certain equipment and instruments were lent for the purpose. A radiometer was also lent to the British North Greenland Expedition. There were again several inquiries concerned with biological aspects of the radiation records; general inquiries on radiation questions continued to increase.

Meteorological Office,
Air Ministry, London, W.C.2.
April, 1953.

Air Ministry, Meteorological Office

ESKDALEMUIR OBSERVATORY

Annual Report for the year 1st April, 1952 to 31st March, 1953

1. Meteorological Observations and Records

The normal instrumental and other observations at prescribed hours were made for synoptic reporting and climatological purposes. Autographic records of atmospheric pressure, dry and wet-bulb temperature, wind, rainfall and sunshine were maintained. A night sky (pole-star) recorder continued in operation. Records of atmospheric pollution (smoke filter) were obtained for the Director of Fuel Research, D.S.I.R.

Meteorological tabulations were prepared for official publications.

Details of the routine observations made at the Observatory are given in the Appendix to the Annual Report for 1951 - 52. The period of the chart for the La Cour quick-run photographic magnetograph is now 24 hours (not 21 hours) and Section III (b) of the appendix should be amended accordingly.

2. Solar Radiation

Records of total and diffuse radiation received on a horizontal surface were resumed in June 1952, after repair to the instruments. The record of diffuse radiation ceased again in December, the outer dome cover having been blown away.

3. Terrestrial Magnetism

Magnetic declination, horizontal and vertical force are recorded continuously by two sets of La Cour variometers, ordinary-run and quick-run. All magnetic storms during the period were registered successfully. Improvements were effected in the optical systems of the variometers, and the duration of run of the quick-run set was changed from 21 to 24 hours.

The autographic records were standardized by absolute observations of declination, horizontal force and vertical force made thrice weekly using a Kew-pattern unifilar magnetometer, a Schuster-Smith coil magnetometer and a Schultze dip inductor, respectively. In addition comparison observations were made with a QHM (quartz horizontal force magnetometer) and a BMZ (vertical force balance magnetometer).

The records were tabulated preparatory to further elaboration for inclusion in the Observatories' Year Book. International daily character figures and three-hourly range indices (K) were assigned. Hourly values of declination were sent weekly to the Colliery Guardian and The Iron and Coal Trades Review, while copies of magnetograms were supplied on request to National Coal Board and other establishments. Notification of magnetic disturbance exceeding certain limits was sent to the Radio Research Station at Slough, the Marconi Company at Chelmsford and the Cavendish Laboratory. A report was made to the Director, Meteorological Service, Dublin, concerning the extent to which magnetic disturbance may have affected the regular measurements of declination, horizontal force and dip made during the year at Valentia Observatory.

Facilities were given in May to members of the Department of Geophysics, Cambridge University, to determine the temperature characteristics of two vertical force instruments used in field work in northern England.

Two large parties of mining engineers visited the Observatory.

/4.

4. Atmospheric Electricity

Continuous photographic records of atmospheric electric potential gradient were maintained, and measurements of the electric potential at one metre above level of ground were made several times monthly. The Wulf electrometers used were calibrated at intervals.

Meteorological Office
Air Ministry, London, W.C.2.
April, 1953.

METEOROLOGICAL COMMITTEE

AIR MINISTRY

INTERNATIONAL MEETINGS (July, 1952 to June, 1953)

1. WORLD METEOROLOGICAL ORGANISATION

(a) Executive Committee, held in Geneva, 9th to 27th September, 1952, attended by:-

The Director.
Cmdr. C.E.N. Frankcom (part-time - as President of the Commission for Maritime Meteorology).

(b) Commission on Maritime Meteorology, held in London, 14th July to 1st August, 1952, attended by:-

Cmdr. C.E.N. Frankcom (President of the Commission)
Cmdr. J. Hennessy
Mr. R.F.M. Hay
Dr. R. Frith

(Note: This meeting was also attended by Instr. Captain P. Bracelin (D.N.W.S.))

(c) Committee on Clouds and Hydrometeors, held in Paris, 24th July to 6th August, 1952, attended by:-

Mr. C.K.M. Douglas

(d) Commission for Climatology, held in Washington, D.C., 12th to 26th March, 1953, attended by:-

Mr. R.G. Veryard.

(e) Working Group on Radio-electric Meteorology of the Commission for Aerology, held in Zurich, 17th to 24th March, 1953, attended by:-

Mr. A.L. Maidens

(f) Commission for Synoptic Meteorology, held in Washington, D.C., 2nd to 29th April, 1953, attended by:-

Mr. S.P. Peters
Mr. C.V. Ockenden
Mr. W.H. Bigg

(Note: This meeting was also attended by Instr. Captain P. Bracelin (D.N.W.S.))

2. INTERNATIONAL CIVIL AVIATION ORGANISATION

(a) Second South East Asia/South Pacific Regional Air Navigation Meeting, held in Melbourne, 13th January to 9th February, 1953, attended by:-

Mr. G. Needham

(b) First Air Navigation Conference, held in Montreal, 24th February to 25th March, 1953, attended by:-

Mr. W.H. Bigg
Mr. J.C. Cumming

/3.

3. OTHER INTERNATIONAL MEETINGS

(a) Radar Weather Conference, held under the auspices of the Stormy Weather Group, Macdonald Physics Laboratory, McGill University, Montreal, 15th to 17th September, 1952, attended by:-

Mr. R.F. Jones

(b) Symposium on Forecasting Research, organised by Professor C.G. Rossby at the Institute of Meteorology, University of Stockholm, 13th to 18th October, 1952, attended by:-

Dr. R.C. Sutcliffe

(c) United Nations Economic and Social Council - International Co-operation on Water Control and Utilization and on the Development of Arid Land, meeting held in London, 25th September to 1st October, 1952, attended by:-

Mr. L.P. Smith (as W.M.O. Observer)

(d) International Air Transport Association, Meteorological Group, third meeting, held in London, 27th October to 1st November, 1952, attended by:-

Mr. J. Durward (part-time)
Mr. J.C. Cumming (part-time)
Mr. M.H. Freeman (part-time)

Meteorological Office,
Air Ministry, London, W.C.2.
May, 1953.

M.C.-46.

METEOROLOGICAL COMMITTEE

AIR MINISTRY

Teaching and Research in Meteorology at British Universities.

1. At the 167th meeting held on 12th June, 1952, the Meteorological Committee discussed the present position of meteorological teaching and research at British Universities, and it was agreed to seek the advice of the Royal Meteorological Society as to ways of encouraging more universities to take an active interest in meteorology.

2. In accordance with the above decision the Secretary wrote to the Secretary of the Royal Meteorological Society requesting that the matter be brought to the notice of the Council of the Society, and that the Meteorological Committee be informed in due course of the Society's views on this question.

3. A reply has been received from the Royal Meteorological Society, and is attached at Appendices A and B for consideration by the Meteorological Committee.

R.J. WILLIAMS.

Secretary.

Meteorological Office,
Air Ministry, London, W.C. 2.
May, 1953.

Letter dated 11th May, 1953, from the Royal Meteorological Society to the Secretary, Meteorological Committee.

MES/JS
A.922563/47
A.968486/48

R.J. Williams Esq.,
Secretary,
Meteorological Committee,
Meteorological Office,
Air Ministry,
Kingsway, W.C. 2.

Dear Sir,

Meteorological Teaching and Research at British Universities

The Council of the Royal Meteorological Society have had before them your letter of 21 October last and welcome the opportunity to express an opinion on the promotion of meteorological teaching and research in the universities, a matter upon which a special study is being made by a panel appointed by the Council. Although this study is by no means complete, the enclosed memorandum, so far as it goes, may be taken as expressing the interim views of the Council, and you will appreciate therefore that some of the opinions expressed might call for amendment at a later stage.

It would be of much interest to the Council and most helpful to the panel to learn of the reaction of the Meteorological Committee and to have the benefit of any further advice or information which they are able to give on this important subject.

Yours faithfully,

(Sgd.) M.E. SHOENBERG.

Assistant Secretary.

APPENDIX B. TO M.C.-46.

THE PROMOTION OF METEOROLOGICAL TEACHING AND RESEARCH AT BRITISH UNIVERSITIES

Memorandum presenting the views of the Council of
the Royal Meteorological Society for the information
of the Meteorological Committee of the Air Ministry

11 May 1953

It is taken that the invitation from the Meteorological Committee given in their letter of 21 October 1952 is to express an opinion on the best ways of promoting university work in meteorology and does not call for the preparation of a further reasoned case in support of the policy of expansion, a policy which is supported by the Committee and has been advocated by the Society on various occasions.

A practical policy must of course be related not only with requirements but also, in large part, with the present position of meteorology in the universities and, while this position must be well known to the Committee, it is useful to recall the main features. Only at the Imperial College of London University, at Oxford, Cambridge and Edinburgh, is meteorology formally recognized by staff appointments, by courses of teaching and by research facilities. The arrangements differ considerably. At the Imperial College we have a comprehensive and independent department concentrating on research and post-graduate teaching; at Edinburgh we have meteorology actively introduced at the undergraduate level within the department of Physics; at Oxford and Cambridge there are small groups associated with Physics departments with somewhat different university organizations but concentrating again on research and post-graduate work of a specialized rather than a comprehensive meteorological character. Thus only at Edinburgh could a graduate, with a first degree, represent himself as qualified in meteorology, but here the research facilities are limited. Only at the Imperial College is the broad field of meteorology tolerably well catered for at the post-graduate level.

It has often been argued whether university meteorology should be primarily post-graduate work, but the arguments in favour have possibly been coloured by an insistence, (not perhaps inappropriate when the university effort was much smaller even than today) on the need to advance the science by research with, consequently, less regard for the need to disseminate meteorological knowledge through the scientific community from the school stage onwards. The Society is convinced that there is amongst the community in general and the scientific community in particular a serious inadequacy in meteorological awareness and that this stems largely from the failure of the universities to provide opportunities for even a limited number of science graduates to become acquainted with modern progress. Thus those who pass out to become school teachers or to take up posts in administration or scientific work in industry, the state service or in the universities, are in general totally ignorant of the scope of the science of meteorology, with its possible applications to so many activities, and the system of exclusive attention to post-graduate work is not calculated to improve the position very rapidly.

Even if the limited objective, of advancing knowledge by post-graduate teaching and research, is accepted, the system has been found to have a very serious drawback which is fully recognized by the University groups. The ablest student contemplating research is naturally attracted by subjects with which he has some acquaintance and he will rarely entertain thoughts of meteorology unless his interest has already been awakened in his undergraduate years; similarly, he will not look to the state Meteorological Service as an attractive career. It seems essential to try to get to the student at an earlier stage if the university research groups and the Meteorological Office are to have a fair chance of attracting the ablest students and are not to be dependent on those, not usually the ablest, who having no strong leaning drift into the subject as a possible opening.

It is concluded therefore that a wise policy for university meteorology must find a place for undergraduate as well as post-graduate teaching.

In reviewing the present state it is necessary also to bear in mind that much research activity either within or on the borders of meteorology is carried out by individual workers, especially in mathematics and physics departments. Also, of course, geography schools do much to promote interest in weather and climate although the geographers are the first to insist that their scope does not extend to the development of a modern science and would welcome the extension of activity in the science faculties.

Coming now to the practical policy of the expansion of university work it seems possible to put the main issue in the form of two questions.

Should university meteorology be developed in separate Departments of Meteorology or should it come within some other department?

Meteorology is a science of broad scope and could readily be developed into a separate university subject in the same way as, say, geology. Obviously, mathematics and physics would be required and a school of meteorology would often benefit from the recruitment at the post graduate stage of students who had earlier specialized in other basic disciplines but this is no novel position. The fundamental difficulty in the way of this policy is undoubtedly that of careers. The graduate in meteorology, with the label 'meteorologist' could look to few openings outside the Meteorological Office or meteorological services oversea. When to these posts are added university vacancies from time to time the number of posts to be filled each year is still small and could not support many departments.

On the other hand physicists or mathematicians who have specialized in meteorology without losing the wider qualification seem from recent experience, to be at no general disadvantage in the wide fields open to graduates. Indeed meteorological interests would almost seem to have a scarcity value and there may be a latent demand for scientists with meteorological experience.

In view of these arguments it is concluded that it would be unwise to strive towards separate departments of meteorology at this stage, and this in spite of the gratifying success at the Imperial College. Here the emphasis has been towards research and post-graduate teaching and a considerable department has been created able to stand securely on its research activity alone. Unless the way can be seen to build up similar groups elsewhere it would seem unwise to insist on independence, while the need to reach the undergraduate body seems to require a broader basis as a general principle.

Granted this, the appropriate department is hardly debatable. Meteorology is a branch of physics, albeit geophysics, and while mathematicians, statisticians, geographers and perhaps others may find a post-graduate home in meteorology there is no doubt that formal courses in meteorology must be regarded as appropriate only to physics schools if they are not to be independent.

It is believed that the introduction of meteorology into physics courses would also be to the general advantage of the physicist especially as illustrating fundamental principles which receive little emphasis in many courses in 'modern physics'.

Should meteorology be introduced at many universities or should the present aim be towards expansion at a selection of universities?

There is reason to suppose that, without special sponsoring, interest may lead to spontaneous activities especially if physicists or mathematicians with meteorological interests become more numerous and take up normal appointments in university departments. Thus much activity has developed at Edinburgh around the personality of a member of the physics staff and awakening interest at Durham is also believed to be of local origin. Expansion on these lines where it arises spontaneously is obviously not to be discouraged but it is believed that the balance of advantage is definitely not with the single staff appointment. Meteorology is a broad subject and there is much benefit to be gained from working within a group, if only a small group of two or/ three.

It is therefore recommended that every opportunity should be taken to promote the enlargements of meteorological groups at a few universities. The department at the Imperial College being now well established it may be that the time has come to look elsewhere, and it would seem that Oxford, Cambridge and Edinburgh, where meteorology is already recognized and active, select themselves as centres for expansion. Without further study of the circumstances the Royal Meteorological Society is not in a position to suggest what scale of expansion should be contemplated either immediately or over a term of years, nor can it suggest the avenues through which approaches might most effectively be made. These questions and suitable action will be further considered in due course. The suggested policy of development within Physics departments certainly in no way implies a small scale of expansion or the exclusion of professorships. A career in academic meteorology must be provided if there is to be healthy competition for junior university posts and one or two additional chairs in meteorological physics is certainly a justifiable goal for the immediate future.

Apart from the establishment of additional posts for teaching and research, the Society has studied other means of promoting university work and commends suggestions which the Meteorological Committee should be well placed to explore.

Research grants and scholarships. A large proportion of research students in physical subjects are supported by D.S.I.R. or other government grants and it would direct attention to our subject if, perhaps through the influence of the Air Ministry, special provision were to be made for meteorological studies. Such grants would be made available to any suitable graduate and should be tenable wherever there are facilities for pursuing the chosen line of research whether or not there may be a meteorological post so described on the permanent staff of the university.

Interchange between the universities and the Meteorological Office. Official policy now makes provision for scientists to be engaged in temporary research posts in government departments with superannuation contributions on the same basis as for university appointments. In meteorology, with such a large proportion of research activity within the Meteorological Office, it would also be highly advantageous to both sides if permanent established staff of the Office were given special leave with pay to continue special lines of research at universities in appropriate cases.

Exchange lecturers between universities. Universities providing courses in meteorology might extend their scope by arranging for advanced courses of lectures by visiting staff from other universities. As an example a course in Dynamical Meteorology might be provided for the Cambridge Mathematical Tripos Part III so possibly attracting the first class mathematician to the subject - a great difficulty at present.

Finally a few general remarks on the relationship between the universities and the Meteorological Office are appropriate. While the government department is necessarily much concerned with providing a public service and the universities are more properly concerned with fundamental science the Society is convinced that it is damaging to the science and to the profession to attempt a division of responsibilities in the fields of research, although some difference in emphasis is inevitable. Far from advocating a delimiting of territories we should support more overlapping of interests. On the one hand we should like to see research staff in the Office pursuing fundamental problems as they arise without being too much concerned with immediate objectives. On the other hand the public service should be able to look to the universities for the stimulus of independent research in all branches of the science. The fact that problems of synoptic meteorology and of dynamical and physical climatology, to take an obvious example, are of particular importance to the public service should strengthen rather than weaken the case for university teaching and independent university research. Whatever view may be taken of the science of meteorology the problems of weather and climate must take a central position. In other countries university meteorology is well represented by experts in weather processes and a large proportion of the significant contributions to synoptic and dynamical meteorology have come from the universities. In the expansion of university studies in this country we should like to see the scope extended to cover all branches of the science and even especially those branches with which the public service is particularly concerned.

The main recommendations may conveniently be summarized:

1. University teaching of meteorology should be promoted at both the undergraduate and post-graduate levels. The aim should be to spread awareness of the subject through a field much wider than that of the future professional meteorologist and to awaken the interest of the ablest students at an early stage.

2. University meteorology should preferably be promoted by establishing posts in meteorological physics within Physics departments rather than by creating separate departments of meteorology at the present stage. This does not however imply that professorships are not required.

3. The spontaneous growth of meteorological interests in any university is welcome but outside influence should be directed towards larger groups at those universities where the subject is already recognized in their staff establishments and courses - specifically at Oxford, Cambridge and Edinburgh.

4. Special grants and scholarships for meteorological research would do much to attract the best students.

5. Facilities for Meteorological Office staff to work at the universities, on special leave with pay, should be available in appropriate cases.

6. Universities should take the whole field of meteorological science as their proper responsibility and should not neglect, in particular, the central problems of atmospheric circulations, weather and climate.

7. The Royal Meteorological Society is not at present able to offer considered suggestions on the action which the Meteorological Committee might find effective in promoting the policy. This problem is being further studied.

Royal Meteorological Society.
11 May 1953.
RCS/JS.

IMPORTANT

All communications must be addressed to THE DIRECTOR

In reply to this letter quote

Telegrams:—"WEATHER TELEX LONDON"
Telephone:—HOLBORN 3434
Extension. :

METEOROLOGICAL OFFICE,
AIR MINISTRY,
KINGSWAY,
LONDON, W.C.2.

28 November, 1953.

Dear Sir,

No matters of sufficient importance have arisen since the Committee met at the end of May to warrant discussion at a formal meeting, and in accordance with the usual practice, agreed by the Committee, the Chairman has asked me to inform you that, unless any member particularly wishes him to call a meeting, he proposes to consider the information contained in this letter as officially communicated to members and as taking the place of this year's autumn meeting.

2. The Annual Report of the Meteorological Committee for the year 1st July, 1952 to 30th June, 1953, (amended as indicated in the Minutes of the meeting held on 28th May), was submitted to the Secretary of State for Air on 5th September. The Secretary of State approved the Report.

3. The following changes have taken place in the membership of the Committee:-

Sir David Brunt and Professor H.S.W. Massey have succeeded Professor G.M.B. Dobson, C.B.E., and Dr. O.G. Sutton, C.B.E. as the representatives of the Royal Society.

Mr. G.M. Macintosh, O.B.E. has taken the place of Mr. G.W. Stallibrass, O.B.E. as a representative of the Ministry of Transport and Civil Aviation.

The following change has also taken place in the membership of the Advisory Committee on Meteorology for Scotland:-

Sir Edward Appleton, G.B.E., K.C.B., has been nominated to fill the vacancy in the representation for the University of Edinburgh.

4. Meteorological Teaching and Research in Meteorology at British Universities. - The financial implications of the recommendations made by the Royal Meteorological Society and the best methods of implementing them are being examined, but it has not yet been possible to submit proposals to the Chairman for his consideration.

5. Provision of a Canberra aircraft for meteorological research. - A Canberra jet aircraft was delivered to the Meteorological Research Flight on 24th July, and is now being modified to meet the special requirements of meteorological research. It is hoped that flying in the Canberra will commence at an early date.

6. Airmet Broadcasts. - Discussions have continued with the British Broadcasting Corporation with a view to securing a broadcasting frequency which would permit the re-establishment of the Airmet service. The B.B.C. are making a detailed investigation of this question and it is hoped that they will be shortly in a position to make a formal offer of facilities for re-starting the Airmet service on a partial basis.

/With

To Members of the Meteorological Committee.

With regard to the improvement of existing arrangements for the broadcasting of weather forecasts in the normal daily programmes, agreement has been reached with the B.B.C. for the allocation of three ten-minute periods for weather broadcasts at 0650 and 0750 in the Home Service and a late evening period at 2250 in the Light Programme. The first five minutes will be used for shipping forecasts, agricultural bulletins and a general review of weather over the country. The second five minutes will be used for the general forecast and outlook followed by the district forecast. Regional forecasts will be given at 1255 and 1755 and there will be a new period of five minutes at 0920 on Sundays. It is hoped that a new type of service at a fixed hour will be included in the television service in which the presentation will be given by a member of the Meteorological Office staff. It is also hoped that these new arrangements will commence in the near future.

7. Staffing in the Meteorological Office. - Mr. J.S. Sawyer and Mr. A.C. Best have been promoted to the grade of Senior Principal Scientific Officer to fill respectively the posts of Assistant Director of Forecasting Research (following the promotion of Dr. R.C. Sutcliffe notified at the last meeting) and Assistant Director for Special Investigations (on the retirement of Mr. C.S. Durst). Dr. G.D. Robinson has been awarded a special promotion on merit to the grade of Senior Principal Scientific Officer. Dr. Robinson is the first member of the Meteorological Office staff to be awarded such a promotion.

8. Vacation students. - Applications for attachment to the Meteorological Office during the 1953 summer vacation were received from 38 students at 17 Universities. From these 38 students, 12 were selected for attachment to the Meteorological Office.

9. East Coast Flood Warning System. - The Meteorological Office is participating in the arrangements made for a system of flood warnings as recommended in the Interim Report of the Departmental Committee on Coastal Flooding (the Waverley Committee). The warning system is based on the Central Forecasting Office, Dunstable. Harbour Masters report their tide gauge readings to the Central Forecasting Office who, in collaboration with an officer of the Hydrographic Department, Admiralty, specially attached for the purpose, issue flood warning messages to the River Boards and Police Authorities concerned. The warning system is confined to the East Coast of England and will operate each winter between 15th September and 30th April. The system was introduced on 15th September, 1953.

10. Arrangements have been made for the issue of Meteorological Research Papers approved for general distribution, to Universities in the United Kingdom which have recognised courses in meteorology. "List of Titles" of approved Meteorological Research Papers are distributed to other British Universities.

11. Discussions have taken place between representatives of the Meteorological Office, the Royal Meteorological Society and the Glaciological Society about the continuation of the Snow Survey of Great Britain which the Glaciological Society can no longer maintain. It has been agreed that the Meteorological Office will take over the work of the Snow Survey.

12. Again this year, members of the staff of the Meteorological Office assisted in a series of demonstrations of radio-sonde equipment at the Radio Exhibition held between 1st to 12th September at Earls Court, London.

13. As a result of agreement with the National Physical Laboratory, the 1854 and 1858 standard barometers, together with the cathetometer and standard yard used with them, which have hitherto been kept at Kew Observatory have been transferred to the custody of the National Physical Laboratory.

/14.

14. Members of the staff of the Meteorological Office have attended or will attend the following international and other meetings:-

(a) World Meteorological Organisation

(i) Executive Committee, held at Geneva, 6th to 27th October, 1953, attended by:-

The Director.

(ii) Commission for Instruments and Methods of Observation, held at Toronto, 10th August to 5th September, 1953, attended by:-

Dr. D.N. Harrison.
Dr. R. Frith.

(iii) Commission for Aerology, held at Toronto, 10th August to 5th September, 1953, attended by:-

Dr. R.C. Sutcliffe.
Miss E.E. Austin.

(iv) Commission for Agricultural Meteorology, held at Paris, 3rd to 20th November, 1953, attended by:-

Mr. L.P. Smith.

(v) Commission for Bibliography and Publications, held at Paris, 24th November to 14th December, 1953, attended by:-

Mr. G.A. Bull.

(b) International Civil Aviation Organisation

(i) Third Conference on North Atlantic Weather Stations, held at Brighton, 8th to 23rd July, 1953, attended by:-

Cmdr. C.E.N. Frankcom.

(ii) Second Africa-Indian Ocean Regional Air Navigation Meeting, held at Teneriffe, commencing 17th November, 1953, attended by:-

Mr. G. Needham.

(c) Other Meetings

(i) Rocket Conference arranged by the Gassiot Committee of the Royal Society, held at Oxford, 24th to 26th August, 1953, attended by:-

Dr. J.M. Stagg.
Mr. H.W.L. Absalom.

(ii) Joint meeting of the Royal Meteorological Society and the American Meteorological Society, held at Toronto, 9th to 15th September, 1953, attended by:-

Dr. R.C. Sutcliffe.
Mr. A.C. Best.
Dr. G.D. Robinson.
Mr. J.S. Sawyer.
Mr. J.K. Bannon.
Mr. R.J. Murgatroyd.

Yours faithfully,

E.L. Williams
Secretary.

MINUTES

METEOROLOGICAL COMMITTEE

One Hundred and Sixty-Ninth Meeting, held in Historic Room 13, 4th Floor, Air Ministry, Whitehall Gardens, S.W.1. at 11 a.m. on 15th June, 1954

PRESENT:-

Mr. George Ward, M.P. (Chairman)
Under-Secretary of State for Air

Mr. W. J. Bigg (Colonial Office)
Mr. I. V. H. Campbell (Air Ministry)
Professor W. M. H. Greaves (Royal Society of Edinburgh)
Instr.-Captain A. E. Johnston (Naval Weather Service)
Mr. W. Lewis (Scottish Office)
Mr. G. M. Macintosh (Ministry of Transport and Civil Aviation)
Air Marshal T. G. Pike (Air Ministry)
Captain J. H. Quick (Ministry of Transport and Civil Aviation)
Professor P. A. Sheppard (British Universities)
Dr. O. G. Sutton (Director, Meteorological Office)
Mr. R. J. Williams (Secretary)

Apologies for absence were received from:-

Sir David Brunt (Royal Society)
Major-General R. W. Goodbody (War Office)
Professor H. S. W. Massey (Royal Society)
Sir Edward Salisbury (Ministry of Agriculture and Fisheries)
Dr. O. H. Wansbrough-Jones (Ministry of Supply)
Instr.-Captain P. Bracelin (Director, Naval Weather Service)
who was represented by Instr.-Captain A. E. Johnston.

1475. The Chairman reported the following changes in the membership of the Committee:-

Sir David Brunt, F.R.S. and Professor H. S. W. Massey, F.R.S., have succeeded Professor G. M. B. Dobson, C.B.E., and Dr. O. G. Sutton, C.B.E., as the representatives of the Royal Society.

Major-General R. W. Goodbody, C.B., D.S.O., has replaced Major-General K. F. MacK Lewis, C.B., D.S.O., M.C., as the War Office representative.

Mr. W. Lewis has succeeded Mr. H. R. Smith, C.B., as the representative of the Scottish Office.

Mr. G. M. Macintosh, O.B.E., has succeeded Mr. G. W. Stallibrass, O.B.E., as a representative of the Ministry of Transport and Civil Aviation.

Air Marshal T. G. Pike, C.B., C.B.E., D.F.C., has replaced Air Marshal Sir Ronald Ivelaw-Chapman, K.C.B., K.B.E., D.F.C., A.F.C., as the representative of the Air Staff.

The Chairman extended a warm welcome to the new members on behalf of the Committee.

1476. The Chairman stated that it was necessary to elect a Vice-Chairman to succeed Professor G. M. B. Dobson who had ceased to represent the Royal Society on the Committee. He proposed that Sir David Brunt be elected Vice-Chairman and this was agreed by the Committee.

/1477.

1477. The Minutes of the 168th meeting held on 28th May, 1953, were confirmed.

1478. Action arising out of the 168th Meeting.

(a) The Director reported that a preliminary examination had been made into the financial implications of the recommendations made by the Royal Meteorological Society in regard to meteorological teaching and research at universities and the best methods of implementing them. However, the examination had not yet reached a stage where it was possible to submit proposals to the Chairman for his consideration. In this connection the Director mentioned that he had under consideration at the moment various changes which he considered to be necessary in the organisation and work of the Office. He suggested that further examination of the recommendations made by the Royal Meteorological Society should await the contemplated reorganisation of the Office, when it would be possible to give the authorities concerned a firm factual picture of future needs for meteorological teaching at universities. With regard to Recommendation No. 5 made by the Royal Meteorological Society, the Director thought that the Committee would wish to know that:-

(i) Mr. L. P. Smith, Principal Scientific Officer, Head of the Agricultural Meteorology Branch of the Office had been awarded a Nuffield Foundation Research Fellowship tenable from 1st June, 1954, for ten months. Mr. Smith intends to study the application of meteorology to agriculture in various Commonwealth and foreign countries.

(ii) Mr. P. Goldsmith, Assistant Experimental Officer, has been selected for a bursary, to be taken up in 1954, for full-time study at a University.

(iii) Mr. J. R. Grundy, Assistant Experimental Officer, has been awarded a studentship at the Royal Military College of Science, Shrivenham, to be taken up in the autumn of 1954.

(b) With regard to the improvement of existing arrangements for the broadcasting of weather information which the Committee recommended at their last meeting, the Director reported that the presentation of forecasts by members of the Meteorological Office staff was now made daily in the television service. The British Broadcasting Corporation had been most helpful in developing this service. An analysis of the reactions of the general public to this type of presentation, made by the B.B.C. Listener Research Unit, showed that some 88% preferred the new service; some 4% liked it less and the remainder expressed no preference. This result was considered by the B.B.C. to be practically a 100% favourable response.

An improved service in the sound radio programmes presented more difficulty, as these programmes are more rigidly cast than the television programmes. However, negotiations are in hand and some progress has been made. Additional weather broadcasts are already included in the normal daily programmes and in the late evening broadcast in the Light Programme at about 11 p.m. the Office is allowed a good deal of freedom in the presentation of the forecasts. It has also been found possible to arrange for one of the Regional Stations to broadcast a special regional weather bulletin. Owing to shortage of staff and other commitments it has not been found practicable to extend the regional broadcasts at present.

The Director also mentioned that it is proposed to hold an informal discussion in the near future with certain authorities concerned with various public and private activities, e.g. agriculture, yachting, etc. to ascertain the type of weather information they require and the best way of meeting their needs.

The Chairman stated, and the Committee agreed, that great progress had been made in the past few months in the broadcasting of weather information in the normal B.B.C. daily programmes. The Chairman also mentioned that he was aware that many of his constituents appreciated the way in which the weather forecasts are now being presented in the television service.

Several members of the Committee emphasized the need of using less scientific phraseology in the wording of the forecasts, and the importance of giving the public some idea of the degree of confidence which the forecaster attached to his statements.

With regard to the re-establishment of Airmet broadcasts or similar service, the Chairman stated that the general position remained unchanged. He had consulted the Assistant Postmaster General about the allocation of a suitable frequency for the broadcasting of meteorological information. We are, however, completely advised by the Post Office authorities in this matter, who are reluctant to seek changes in the international agreement now in force. In this connection the Chairman drew attention to the improved service now given through B.B.C. channels.

The Director mentioned that an offer had been made of a medium frequency of a power which only gave good reception up to 40 miles and fairly good reception up to 70 miles. It was impossible to increase range on this frequency without very costly and extensive re-equipment.

The Director also referred to discussions which had taken place with the Postmaster General about the provision of a telephone weather service similar to TIM. The number of telephone enquiries to the Meteorological Office from the public had greatly increased in recent years and there would appear to be a need for a WEA telephone system which would give information about present weather and a short range forecast and outlook. The Director mentioned that such a service was in operation in the United States of America. However, owing to shortage of equipment and other technical difficulties, the Post Office could not see their way to proceed with the installation of such a system at the present time. This matter will continue to be pursued as opportunity offers.

1479. Changes in the structure of the Meteorological Office.

The Chairman drew the attention of the Committee to the changes which had been made in the structure of the Meteorological Office as shown in the paper M.C. -52.

The Director stated that some re-allocation of posts had been made within the Deputy Directorate of Research and the Deputy Directorate of Forecasting. The main purpose of the changes is to group under the Deputy Director (Research) all branches which exist primarily for research and to transfer to the Deputy Director (Forecasting) certain branches formerly controlled by the Deputy Director (Research) whose major function is operational. Three new Assistant Director posts have been created to be in charge of Central Forecasting, Climatological Research and Public Services.

The Assistant Director (Public Services) will be responsible for the development and co-ordination of general and specialised forecasting services, except for the armed services and civil aviation.

He will be responsible for publicity arrangements for Meteorological Office services and developments and will supervise all weather services for the British Broadcasting Corporation. He will also be responsible for the verification of forecasts issued by the Central Forecasting Office.

1480. Annual Report of the Director of the Meteorological Office for the year April 1, 1953 to March 31, 1954.

The Chairman invited the Committee to consider the Annual Report of the Director of the Meteorological Office for the year April 1, 1953 to March 31, 1954 (M.C. -47).

At the request of the Chairman, the Director drew attention to items of special interest in the Report. These included:-

> Section 2(1)(c) - Ocean Weather Ships. At the Fourth Conference on North Atlantic Weather Stations held by the International Civil Aviation Organization in Paris last February, a new agreement was concluded on the operation and maintenance of the North Atlantic Weather Stations. The new arrangements provide for a network of nine stations which will be hardly less effective than the present arrangements. They also provide for a more efficient schedule of operation under which the existing European vessels will work together to greater intensity than at present, serving at different stations in turn and sharing the relatively light with relatively heavy operational tasks. Three stations will be operated by the United States, one station jointly by the United States and Canada and five stations jointly by the United Kingdom, France, Netherlands, Norway and Sweden. The Director expressed his satisfaction with the agreement concluded at the Conference and it was gratifying to note the large amount of co-operation and agreement which existed between the countries concerned at this meeting.
>
> Section 3(4)(b). Agricultural Meteorology - Special Work. The Director referred to his remarks about the award of a Nuffield Foundation Research Fellowship to Mr. L. P. Smith, Head of the Agricultural Meteorology Branch in minute 1478(a). The importance of the work which is being done by the Branch was stressed in particular liaison with agricultural and related organizations and also the special investigations which had been carried out during the year.
>
> Section 4(3). Forecasting Research. The Director called attention to work being done at Dunstable on numerical methods in weather forecasting. Similar work has been carried out in the United States, and during a recent visit to America he had learned that a Joint Numerical Weather Prediction Unit is to be set up to provide routine numerical prediction as an aid to the normal methods. This involves the installation of a digital computer of very high speed and large capacity, together with a specialist staff.
>
> The Meteorological Office has made considerable progress with the development of similar methods, using a computer belonging to a commercial firm, of somewhat limited capacity and rather slower in operation than machines of later design. The results so far obtained are encouraging. He felt that this development may well prove to be one of the turning points of meteorological science, although as yet it was too early to be sure how valuable a tool the machine would prove. He was very anxious to give this work every chance by providing ample opportunities for research.

Professor Sheppard agreed with the Director that the introduction of numerical methods into forecasting was one of the dominant topics in present day meteorology, and he stressed the importance of providing adequate staff and facilities for the research.

Section 5(2). Staff. The Director stated that there was a shortage of twenty Scientific Officers. Difficulty was being experienced in attracting men of good quality to the Meteorological Office. This may be due in part to career prospects and in part to the conditions of service appertaining to the Office, which involve irregular hours of working and the liability to be posted to stations at remote places in the United Kingdom and to others overseas. All possible steps are being taken to improve the position. In this connection the Director mentioned that he proposed personally to give lectures to various University student societies, mentioning the work of the Office and the opportunities which exist for research.

The Committee asked that the following amendments should be made in the Report:-

Galley 2, Gassiot Committee. The entry against Dr. O. G. Sutton to read "Dr. O. G. Sutton (Royal Society member to August 31, 1953, subsequently as Director, Meteorological Office)".

Galley 2, Section 1. The words "and Fishing Fleets" to be added at the end of item (i) of the general functions of the Meteorological Office.

Galley 2, Section 1 and Galley 22, Appendix IV. The references to the financial year to read "1954-55" in both cases.

Galley 6, Section 2(8). In line 9 of the first paragraph "Ministry of Transport" to read "Ministry of Transport and Civil Aviation".

Galley 8, Section 3(1)(f). In the fifth paragraph "Dr. G. M. B. Dobson" to read "Professor G. M. B. Dobson".

Galley 16, Section 5(2)(c). Line 1, for "a" read "some" and lines 3-4 to read "in March, 1954, in Scientific Officers".

Galley 17, Section 5(2)(e). The number of National Service airmen serving in the trade of Meteorologist on March 31, 1954, to be inserted. (Added later: the figure should be 216).

The Committee accepted the Annual Report of the Director for the year April 1, 1953, to March 31, 1954, subject to the amendments mentioned above and any further amendments which members of the Committee might communicate to the Secretary.

1481. Annual Report of the Director of the Naval Weather Service, 1st April, 1953 to 31st March, 1954.

The Chairman referred to the Annual Report of the Director of the Naval Weather Service for the year 1st April, 1953, to 31st March, 1954. (M.C. -48).

Instructor-Captain Johnston, Deputy Director, Naval Weather Service, apologised for the absence of Instructor-Captain Bracelin, who was unable to attend the meeting. Captain Johnston drew attention to the following items in the Report:-

(a) Successful trials of meteorological facsimile equipment had been carried out between the Admiralty Forecast Section and certain H.M. Ships. Full scale transmissions were made at specified times during the Coronation Review and results were very good.

(b) Trials of the lightweight (temperature) radio-sonde developed by the Meteorological Office for gunnery purposes, were carried out at sea in H.M.S. Cumberland. The trials show that the radiosonde is suitable for use at sea and that satisfactory results can normally be obtained up to 25,000 feet.

The Chairman thanked the Director of the Naval Weather Service for his Annual Report which was noted by the Committee.

1482. Report of the Meteorological Research Committee to the Secretary of State for Air for the year ended 31st March, 1954.

The Chairman drew the attention of the Committee to the Report of the Meteorological Research Committee for the year ended 31st March, 1954. (M.C. -49). It was regretted that it was not possible to circulate the Report before the meeting.

Mr. Bigg enquired about the present position of research in tropical meteorology. The Director referred to the difficulties connected with tropical meteorology and emphasized the importance of conducting such investigations on the spot. The shortage of suitable research staff made it difficult to carry out such investigations which would also need special meteorological equipment. The importance of research into tropical meteorology is fully appreciated and he proposed to press the World Meteorological Organization to give special attention to the study of world climatology, beginning with tropical meteorology.

Professor Sheppard agreed that research in tropical meteorology was of importance and suggested that opportunity for the study of these problems would be afforded during the International Geophysical Year which was to take place in 1957-58.

The Committee noted the Report of the Meteorological Research Committee.

1483. Geophysical Work carried out by the Meteorological Office.

The Chairman asked the Committee to consider the paper submitted by the Director about the geophysical work carried out by the Meteorological Office. (M.C. -53)

The Director stated that the matter had arisen from a request by the National Committee for Geodesy and Geophysics for a new seismological station in Scotland. At present, the Meteorological Office has responsibility for three geophysical subjects, atmospheric electricity, terrestrial magnetism and seismology. However, since 1939 it had been the official policy to soft-pedal the geophysical activities within the Office and to limit the work, particularly in seismology, to the routine changing and analysis of records. Atmospheric electricity had some bearing on meteorology, but terrestrial magnetism and seismology have virtually no connection therewith. He considered it was wrong for the Meteorological Office to appear to have an interest in the two latter subjects by taking records without any attempt to undertake serious scientific work. Advances in these subjects can only be made by first-rate scientists and at present there are too many urgent unsolved problems in meteorology to allow any suitable officers to undertake geophysical work. Therefore, with the approval of the Chairman, approaches were made to the National Committee, the Department of Scientific and Industrial Research and the Astronomer Royal with a view to the transfer of seismology and terrestrial magnetism to more appropriate bodies. The result of these enquiries showed clearly that no organization wants to accept responsibility for these subjects. The sub-committee appointed by the National Committee for Geodesy and Geophysics to consider the matter decided to reccommend the Royal Society to draw the attention of the University Grants Committee to the fact that the science of seismology was languishing and to invite the University Grants Committee to consider what could be done to support the subject at some suitable centre such as the Department of Geophysics at Cambridge.

The Director stated that pending the finding of organizations willing to accept responsibility for terrestrial magnetism and seismology he proposed that the Meteorological Office should continue to maintain its work in geophysics at Kew, Eskdalemuir and Lerwick, i.e. the maintenance of instruments and the making of routine observations, but that no new commitments be accepted.

He also mentioned that the position had been explained to the National Committee at a meeting held on 14th June and the National Committee were pleased to learn that the present level of geophysical work by the Meteorological Office would not be reduced. In the meantime, the National Committee would continue their efforts to find a permanent solution to this problem.

After discussion, the Committee agreed the proposals made in the memorandum M.C. -53 in connection with the geophysical work carried out by the Meteorological Office.

1484. Annual Report of the Meteorological Committee to the Secretary of State for Air for the period 1st July, 1953, to 30th June, 1954.

The Chairman invited the Committee to consider, and amend as necessary, the draft Annual Report of the Meteorological Committee to the Secretary of State for Air for the period 1st July, 1953, to 30th June, 1954. (M.C. -54)

The Committee approved the draft Annual Report subject to the following amendments:-

(a) Para. 6, line 4. The following sentence to be added after "programmes":-

"Discussions will take place shortly with the British Broadcasting Corporation to improve still further the service in the sound radio programmes."

(b) Para. 6, line 8. Delete the words "even on a partial basis".

(c) Para. 6, last sentence. Amend to read "The Committee considers that the presentation of a more satisfactory service should continue to be pursued."

(d) Para. 7, line 3. Delete "recruiting visits were made to" and substitute "talks on careers in the Meteorological Office were given at".

(e) Para. 9, lines 8-10. Delete from "the development" to "atmospheric motion" and substitute "the development of numerical methods in weather forecasting and considers that this should be strongly supported".

(f) Para. 11, line 3. Delete 1952 and 1953 and substitute 1953 and 1954.

/1485.

1485. Annual Reports for Kew and Eskdalemuir Observatories for submission to the Gassiot Committee of the Royal Society.

The Chairman asked the Committee to consider the Annual Reports on the work carried out at Kew and Eskdalemuir Observatories during the year 1st April, 1953, to 31st March, 1954. (M.C. -50, Appendices I and II) which had been submitted to the Committee for approval before being transmitted to the Royal Society for circulation to members of the Gassiot Committee.

The Committee noted and approved the Reports.

1486. International Meetings.

The Committee noted the activities of the Meteorological Office in the field of international meteorology as shown in the paper M.C. -51.

1487. Other Business.

Professor Sheppard raised the question of the constitution of the Meteorological Committee and suggested that the time may have come to consider whether some other "users" of the Meteorological Office should be represented on the Committee.

The Chairman stated that he also had recently given consideration to this matter and he had suggested names of some four organizations which he thought might be invited to serve on the Committee. He proposed to discuss this question in detail with the Director and hoped to be in a position shortly to submit to the Committee definite suggestions for a wider representation of "user" organizations on the Meteorological Committee.

1488. Date of Next Meeting.

The Chairman suggested that, following the usual practice, the date of the next meeting of the Committee should be left open, but it might prove necessary to call a special meeting to discuss the matter raised in minute 1487.

1489. The Committee rose at 12.40 p.

M.C. - 47

METEOROLOGICAL COMMITTEE

Annual Report
of the Director of the
Meteorological Office
presented by the Meteorological Committee
to the Secretary of State for Air
for the year
April 1st 1953, to March 31st 1954.

The Annual Report which was previously circulated in proof stage was accepted, subject to amendments, by the Committee - see Minute 1480.

M.C, 48

ANNUAL REPORT

OF THE

DIRECTOR NAVAL WEATHER SERVICE

1st April 1953 to 31st March 1954

For Members of the Meteorological Committee.

SECTION A	GENERAL
B	TRAINING
C	WEATHER MESSAGE ORGANISATION
D	PUBLICATIONS AND CLIMATOLOGY
E	INSTRUMENTS AND EQUIPMENT
F	INVESTIGATIONS

Section A - GENERAL

1. Forecast Section, Admiralty

(a) Routine Weather Messages

Fleet Weather Messages, consisting of synoptics three times daily, analyses twice daily and forecasts twice daily together with gale and upper wind warnings (in conjunction with the Central Forecasting Office, Air Ministry) issued by Forecast Section, Admiralty meet nearly all the requirements of Home Fleet Units, Fleet Carriers read in addition sub-continental or continental broadcasts. The area covered by these messages and also their contents is under constant review to ensure that all units at sea obtain the best available information.

(b) Special Weather Messages and Forecasts.

Special Synoptic Messages have been transmitted for the benefit of meteorological officers appointed to Fishery Protection Vessels and other units for experience in forecasting in Arctic Waters. Such messages have included synoptic and upper air reports to supplement those given in the routine Fleet Synoptic messages. Forecasts covering the operation areas of these vessels have been issued by Forecast Section for purposes of comparison.

The past year has been a busy one from the point of view of special forecasts supplied by the section. Some requests have been met by adding forecasts for the areas of interest to the routine Home Fleet Forecast Messages, but to meet the remainder, 2,947 forecasts have been passed in special signals addressed only to the authorities concerned. These special forecasts have been mainly in connection with coastal tows but have also covered, amongst others, surveying operations in mid-Atlantic by H.M.S. CHALLENGER, work in connection with the swell recorders at Perranporth, and the return of the damaged SWIFTSURE and DIAMOND from Iceland to Chatham.

(c) Facsimile Transmissions.

One of the latest 18" Mufax facsimile transmitters was installed in Forecast Section in April and full scale transmission trials were carried out between 11th May and 5th June, the recorders being fitted in H.M. Ships VANGUARD and EAGLE. A 24-hour schedule consisting of 10 charts and 12 typescript messages was maintained at the request of the Commander in Chief, Home Fleet, full scale facsimile transmissions were made from 13th June to 16th June during the Coronation Review, except for the periods of television broadcasts. Results were very good.

Successful transmissions using three simultaneous frequencies were carried out during Exercise "MARINER", by which time a second transmitter had been installed in Forecast Section and recorders in H.M. Ships ILLUSTRIOUS, SHEFFIELD and SWIFTSURE in addition to those in VANGUARD and EAGLE.

2. Home Air Command

The meteorological centres at Lee-on-Solent, Culdrose and Abbotsinch continue to function as the group advisory and analysis centres for Home Air Command stations. Each centre receives basic information by three teleprinter channels from the Meteorological Office Centre at Dunstable, and in addition collects hourly actuals and terminal forecasts from its own satellites. The group centre at Abbotsinch undertakes the bulk of upper air analyses for guidance within the Command. An organisation for passing up-to-date information and terminal forecasts from group centres, to carriers operating in Home Waters has been devised and has worked satisfactorily.

3. Mediterranean

The Fleet Weather Centre at Malta, under the supervision of the Fleet Meteorological Officer continues to issue gale warnings, forecasts and analyses on the ship broadcasts for small ships and selected basic data for the larger ships with meteorological organisations.

4. Far East

Alterations proposed by the Fleet Meteorological Officer to the Commander in Chief Far East Station, have resulted in the saving of between one to two and a half hours in the delay between observation and broadcast times. The naval airmen formerly attached to Kallang airport for selection and preparation of these messages have been withdrawn and the work is now carried out by Malayan Meteorological Service personnel.

5. Turbulence Reports

Reports of severe turbulence experienced in clear air by naval aircraft have from time to time been forwarded to the Meteorological Office who have a research project on this phenomenon.

6. Naval Weather Service Handbook

A handbook has been published and distributed to the Fleet during the year.

7. Liaison with other Services

Close liaison with all departments of the Air Ministry Meteorological Office was maintained throughout the year, and on overseas stations, liaison was maintained with other meteorological services by the appropriate Fleet Meteorological Officers.

8. World Meteorological Organisation

The Director served as a United Kingdom representative at the First Session of the Commission for Synoptic Meteorology held in Washington in April, 1953.

The Deputy Director served as a United Kingdom representative at the First Session of the Commission for Instruments and Methods of Observation held in Toronto in August, 1953.

/Section B

SECTION B - TRAINING

9. R.N. School of Meteorology

Qualifying courses for officers and ratings are held at the R.N. School of Meteorology, H.M.S. HARRIER, Kete, Pembrokeshire. Those for officers are of 22 weeks duration including 2 weeks of practical training at naval air stations. Those for ratings are of 10 weeks duration, reduced to 8 weeks for National Service men.

Other courses held at the School have been short courses for Officers other than those specialising in meteorology, and refresher courses for officers already qualified in meteorology.

10. R.N.V.R.

R.N.V.R. Meteorological Officers in general continue to do two weeks training each year either at sea in carriers or at Naval Air Stations. A few R.N.V.R. Meteorological Officers and ratings are attached to R.N.V.R. Air Squadrons and carry out meteorological duties for the squadron weekend flying at naval air stations.

SECTION C - WEATHER MESSAGES

11. General

Details of all meteorological broadcasts likely to be required by H.M. Ships are listed in W.7 (Radio Weather Messages).

12. Home Station

The Rugby, Dunstable and Whitehall broadcasts meet the needs of the Home Fleet. The latter is essential for ships with only part-time meteorological organisations and provides a selection of data for the areas in which the Fleet is operating.

13. Mediterranean

The Fleet synoptic and analyses messages are transmitted on the administrative wave. Gale warnings and forecasts are transmitted on the ship wave. Some alterations have been made in broadcast times.

14. Far East

Fleet Weather Messages prepared at Kallang are broadcast on the appropriate naval waves.

15. E. Indies, S. Atlantic, and American and West Indies

The meteorological requirements of the E. Indies and S. Atlantic stations continue to be provided by rebroadcasts of information supplied by national meteorological services. On the American and West Indies station, H.M. Ships read appropriate American and Canadian broadcasts.

/Section D

SECTION D - PUBLICATIONS AND CLIMATOLOGY

16. Publications

(a) Sailing Directions and Weather Handbooks

(i) The meteorological currents and ice sections of the following Admiralty Pilots, have been revised in conjunction with the Meteorological Office, Air Ministry:-

Norway Pilot	Vol. III
Japan Pilot	Vol. II
Bay of Bengal Pilot	
Africa Pilot	Vol. III
Bering Sea Pilot	
Yangtze Kiang Pilot	
South America Pilot	Vol. III

(ii) The revision of the Handbook "Weather on the Mediterranean Station" which it was hoped would be completed during 1953, is now expected in draft by May 1954. Delay has been due to lack of staff in the Meteorological Office.

(iii) The reprint of the Admiralty Weather Manual has been placed on sale to the public through H.M. Stationary Office.

(b) Miscellaneous Publications

The following new publications, (all of Meteorological Office, Air Ministry origin) have also been issued:-

M.O.524g "Upper Air Circulation in low latitudes in relation to certain climatological discontinuties."

M.O.535h "1000-500 mb. thickness. North America to Europe, 1946 - 1951."

M.O.555 "Part 3. Upper Air data - Habbaniya."

M.O.555 "Part 4. ditto - Malta."

17. Climatology

(a) During the year thirty-nine climatological appreciations, reports and answers have been prepared for the Naval Staff, Admiralty Departments and other Naval Authorities.

(b) Liaison in the matter of sea-temperature statistics in their relationship to survival in the open sea has been maintained with the R.N. Personnel Research Committee.

(c) Work on "Sea and river Ice conditions north of the U.S.S.R." has been completed for the Admiralty by a member of the Scott Polar Research Institute. The method of presentation of the report now accords with users' requirements and the report has been forwarded to the Hydrographer for printing in atlas form. It will be on sale to the public.

/SECTION E

SECTION E - INSTRUMENTS AND EQUIPMENT

18. .General

Inspection of Meteorological arrangements in ships under construction and refitting has been carried out. Advice on the supply and maintenance of meteorological instruments has been given to other Admiralty departments and Naval establishments. Arrangements were made for loans of special equipment from the Meteorological Office, with whom a close liaison was maintained on questions of supply and development.

19. Facsimile

Progress in the development and use of meteorological facsimile equipment has been very satisfactory.

20. Lightweight Radiosonde

Trials of the lightweight (temperature) radiosonde, under development by the Meteorological Office for gunnery purposes, were carried out in the Trials Cruiser H.M.S. CUMBERLAND during the 1953 Trials Period. In all cases the sonde and shipboard receiving equipment functioned satisfactorily. The trials show that the sonde is suitable for use at sea and that temperatures can normally be obtained up to 25,000 feet. This is mainly dependent on the ability to determine an accurate height by radar.

21. Hand Assmann Psychrometer

Favourable reports have been received from ships issued with a prototype hand-driven Assmann psychrometer for trial. Arrangements for some minor modifications to be incorporated before its introduction as a naval store are being made by the Meteorological Office.

22. Display Feature

Arrangements were made for the Central Office of Information to produce a feature set of photographs for display overseas illustrating the work involved in preparing a weather briefing for a naval pilot, entitled "The Royal Navy's Weather Eye".

SECTION F - INVESTIGATIONS

23. The Director Naval Weather Service was represented on the Meteorological Research Committee and its three sub-committees. During the year 13 meetings were held and 60 papers discussed.

24. The Meteorological Research Committee published a paper entitled "High level winds over Ocean Weather Ship 'MIKE'" (M.R.P.812) written in the Department.

/25...

25. The Director Naval Weather Service has been represented on the Tropospheric Wave Propagation Committee, which held two meetings during the year.

26. No meeting of the Admiralty Radio Meteorological Committee was held: it has been decided to disband this Committee and to hold only ad hoc meetings.

27. An additional officer was attached to the Department from February to December to investigate problems of Arctic meteorology. This officer visited Norway and spent a month in a Norwegian Weather Ship. A Naval Weather Service Memorandum entitled "Weather Forecasting in Northern Weathers" is in the press.

28. Memoranda entitled "Radar weather echoes and their application to weather forecasting" and "Estimation of Ballistic Temperatures in the Persian Gulf and Aden Areas" have been completed and will be sent for printing shortly.

29. Work on ocean wave forecasting has continued. A paper on the statistical distribution of the heights and periods of ocean waves has been submitted to the Royal Meteorological Society for publication in the Quarterly Journal.

30. The return of Hollerith cards of data from Naval Air Stations in the United Kingdom continues. Visibility at Lossiemouth has been investigated, using Hollerith card data.

31. Technical advice on a number of subjects has been given to Divisions of the Naval Staff and Admiralty Departments.

M.C. - 49

METEOROLOGICAL COMMITTEE

Report of the Meteorological Research Committee
to the
Secretary of State for Air
for the year ended 31st March, 1954.

The Report of the Meteorological Research Committee (M.R.P. 856A) which was previously circulated, was noted by the Committee - see Minute 1482.

METEOROLOGICAL COMMITTEE

AIR MINISTRY

Annual Reports for Kew and Eskdalemuir Observatories for submission to the Gassiot Committee of the Royal Society

1. The Meteorological Committee is required to report annually to the Gassiot Committee of the Royal Society on the use made of the income from the Gassiot Trust for magnetic and meteorological observations or other physical investigations in accordance with the terms of the Trust. For this purpose annual reports on the work carried out at Kew and Eskdalemuir Observatories are sent to the Royal Society for circulation to the Gassiot Committee. A sum of £593. 13s. 2d., being the income of the Gassiot Fund for 1953, has been received by the Air Ministry from the Royal Society.

2. Accordingly, reports for the year ended 31st March, 1954 for Kew Observatory and Eskdalemuir Observatory are submitted at Appendices I and II for approval by the Meteorological Committee.

O.C. SUTTON
Director

Meteorological Office,
Air Ministry, London, W.C.2
May, 1954

G.401477/DMP/5/54/50

Air Ministry, Meteorological Office

KEW OBSERVATORY

Annual Report for the year 1st April, 1953 to 31st March, 1954

1. Meteorological Observations and Records. - Autographic records of atmospheric pressure, dry - and wet - bulb temperature, wind, rainfall, sunshine and evaporation, together with standard measurements of certain of these elements, and of grass minimum and earth temperature, cloud, visibility, and weather, were maintained according to normal procedure. A night-sky recorder was operated regularly. Records of atmospheric pollution were obtained from an Owens automatic filter and from a Department of Scientific and Industrial Research smoke filter.

Tabulations were prepared for the Observatories' Year Book and other official publications. To meet the need of many inquirers it was found convenient to distribute a weekly statement of observations.

Details of the routine observations made at the Observatory are given in the Appendix to the Annual Report for 1951 - 52.

2. Measurement of Solar Radiation. - Continuous records of solar intensity at normal incidence, total and diffuse radiation on a horizontal surface and illumination of a horizontal surface were maintained. The properties of the solarimeters were examined and the effect on the records of imperfect exposure were reconsidered. Some minor changes in the methods of tabulation were made as a result of this work, and small corrections were applied retrospectively to mean values which had been computed from the first five years' tabulations. Analysis of these tabulations, which is expected to yield useful information on the transmission of solar radiation in a polluted atmosphere proceeded slowly.

Further small modifications were made to the bimetallic actinograph, and a specification for its manufacture is being prepared. One of these instruments was on loan to a glaciological expedition operating on the Baffin Island ice-cap, and gave very satisfactory service. A paper on the modified bimetallic actinograph was prepared for publication.

3. Atmospheric Electricity. - Continuous photographic records of the electrical potential gradient were obtained. Measurements of the potential gradient and the air-earth current were made on suitable days.

4. Seismology. - The Galitzin seismographs (two horizontal components and one vertical component) and the short-period vertical component instruments gave satisfactory records. The Monthly Seismological Bulletin, which is widely distributed to other institutions, included particulars of 423 earthquakes recorded at Kew, the epicentres of 99 being determined. Copies of seismograms were supplied at the request of several observatories in other countries.

The staff of the International Seismological Summary continued to be accommodated in the Observatory.

5. Other Investigations. - Investigation of the short period variations of wind and temperature near the ground continued, apparatus capable of recording fluctuations of period less than 1/50 sec. being successfully brought into use. Analysis of records obtained with this equipment is very tedious, but the results confirm previous work at lower resolving power. The present position is that the vertical convective heat flux computed from the simultaneous wind and temperature records is consistently found to be about half the computed energy balance of the ground. The investigation is continuing. It is hoped that further insight will result from a series of field experiments to be undertaken in an open situation at Cardington during 1954. The power spectra of the fluctuations of horizontal and vertical wind were computed for one of the high resolution records, confirming and extending previous results. The possibility of speeding this work by machine computation is being investigated.

Apparatus was set up for the determination of the components of the heat balance at a surface of short grass over a period of about a year. Recording commenced in May, 1953. In connection with this, the calibration of heat flux meters for use in the ground was investigated.

6. Miscellaneous. - A new central heating system and new electric supply wiring was installed. The workshop was re-equiped with machine tools. Workshop assistance was provided to other parts of the Meteorological Office.

A large number of inquiries from individuals and institutions was dealt with. There were several visitors from other countries.

Meteorological Office,
Air Ministry, London, W.C.2
April, 1954

Air Ministry, Meteorological Office

ESKDALEMUIR OBSERVATORY

Annual Report for the year 1st April, 1953 to 31st March, 1954

1. Meteorological Observations and Records. - The normal instrumental and other observations were made for synoptic and climatological purposes. Autographic registration of atmospheric pressure, dry - and wet - bulb temperature, wind, rainfall and sunshine was maintained. A night-sky (pole star) recorder continued in operation. Hourly values of the meteorological elements were tabulated.

Records of atmospheric pollution, by smoke filter, were obtained for the Director of Fuel Research, Department of Scientific and Industrial Research.

Details of the routine observations made at the Observatory are given in the Appendix to the Annual Report for 1951 - 52 as amended in the Annual Report for 1952 - 53.

2. Solar Radiation. - Total radiation received on a horizontal surface was recorded throughout the year and diffuse radiation from June, 1953 (after repair of the instrument).

3. Atmospheric Electricity. - Continuous photographic records of electrical potential gradient were maintained and standardized by absolute measurements made at one metre above the ground at regular intervals of time. The electrometers used were calibrated.

4. Terrestrial Magnetism. - Absolute observations of the magnetic elements were made thrice weekly or more frequently. Magnetic declination was measured with a Kew - pattern unifilar magnetometer. Horizontal force was determined with a Schuster-Smith coil magnetometer until August, 1953 and, after modification of the potentiometer and re-calibration of the standard cells, again in March, 1954: in the interim the quartz-fibre magnetometers Q.H.M. 119 and 120 were used. The Schulze inductor used for measurement of magnetic dip was sent for overhaul in March. The balance magnetometer B.M.Z. 35 was in use from August, 1953, and B.M.Z. 53, lent by the Department of Geodesy and Geophysics, Cambridge University, was brought into use in March, 1954.

Declination, horizontal force and vertical force were recorded continuously by two sets of the la Cour magnetographs, ordinary run and quick run. The orientation of the magnet of the standard horizontal force variometer was checked in July. All magnetic storms were recorded satisfactorily.

The records were tabulated preparatory to inclusion in the Observatories' Year Book. Daily magnetic character figures and also three-hourly indices (K) of disturbance were assigned. As for several years, hourly values of declination were contributed weekly to the Colliery Guardian and the Iron and Coal Trades Review. Copies of the photographic magnetic records were supplied on request to the National Coal Board, to De Bilt and other institutions. Notification of magnetic disturbance exceeding certain limits was sent to the Radio Research Station at Slough, the Marconi Company at Chelmsford and the Cavendish Laboratory at Cambridge.

Meteorological Office,
Air Ministry, London, W.C.2
April, 1954

G.401477(b)/DMP/5/54/75

METEOROLOGICAL COMMITTEE

AIR MINISTRY

INTERNATIONAL MEETINGS (July, 1953 to June, 1954)

1. WORLD METEOROLOGICAL ORGANISATION

(a) Executive Committee, held at Geneva, 6th to 27th October, 1953, attended by:-

The Director.

(b) Commission for Instruments and Methods of Observation, held at Toronto, 10th August to 5th September, 1953, attended by:-

Dr. D.N. Harrison
Dr. R. Frith

(c) Commission for Aerology, held at Toronto, 10th August to 5th September, 1953, attended by:-

Dr. R.C. Sutcliffe
Miss E.E. Austin

(d) Commission for Agricultural Meteorology, held at Paris, 3rd to 20th November, 1953, attended by:-

Mr. L.P. Smith

(e) Commission for Bibliography and Publications, held at Paris, 24th November to 14th December, 1953, attended by:-

Mr. G.A. Bull

(f) Meeting of the Telecommunications Working Group of Regional Association VI (Europe), held at Zurich, 4th to 13th May, 1954, attended by:-

Mr. C.V. Ockenden
Mr. A.L. Maidens

(g) Joint Meeting of the Commission for Aeronautical Meteorology and the MET Division of the International Civil Aviation Organisation, held at Montreal, commencing 15th June 1954, attended by:-

Mr. W.H. Bigg
Mr. J.C. Cumming
Mr. P.J. Meade

2. INTERNATIONAL CIVIL AVIATION ORGANISATION.

(a) Third Conference on North Atlantic Weather Stations, held at Brighton, 8th to 23rd July, 1953, attended by:-

Cmdr. C.E.N. Frankcom

(b) Second Africa - Indian Ocean Regional Air Navigation Meeting, held at Teneriffe, 20th November to 9th December, 1953, attended by:-

Mr. G. Needham

/(c).

(c) Fourth Conference on North Atlantic Weather Stations, held at Paris, 9th to 25th February, 1954, attended by:-

The Director.
Mr. J. Durward
Cmdr. C.E.N. Frankcom

3. OTHER MEETINGS.

(a) Rocket Conference arranged by the Gassiot Committee of the Royal Society, held at Oxford, 24th to 26th August, 1953, attended by:-

Dr. J.M. Stagg
Mr. H.W.L. Absalom

(b) Joint Meeting of the Royal Meteorological Society and the American Meteorological Society, held at Toronto, 9th to 15th September, 1953, attended by:-

Dr. R.C. Sutcliffe
Mr. A.C. Best
Dr. G.D. Robinson
Mr. J.S. Sawyer
Mr. J.K. Bannon
Mr. R.J. Murgatroyd

(c) Discussions on High Speed Computing Methods in Meteorology and Atmospheric Pollution, organised by the John Hopkins University, held in Los Angeles, May, 1954, attended by:-

The Director.

Meteorological Office,
Air Ministry,
May, 1954.

M.C.52

Reprinted from the
METEOROLOGICAL MAGAZINE
Vol. 83, 1954, pp. 129–130

CHANGES IN THE STRUCTURE OF THE METEOROLOGICAL OFFICE

By THE DIRECTOR OF THE METEOROLOGICAL OFFICE

The Meteorological Office has a dual responsibility: first, to provide the national weather service and second, to undertake investigations in the science of meteorology. This two-fold task necessitates an organization which is efficient both as a public service and as a scientific institution. Like any other large organization, public or private, the Office must adjust its structure from time to time to ensure that these requirements are met.

Since taking up my duties in September 1953 I have given much time and thought to the problems which the Office has to face and solve, both now and in the future. It is probably fair to say that in the past 30 years meteorologists everywhere have been more preoccupied with the exploration of the upper air and with the consequences of the rapid development of aviation than with other problems. Today we are faced with a growing demand for services for the general public and for agriculture and industry. This is a challenge which the Office is glad to accept.

To meet all these requirements necessitates some changes in the chain of responsibility and the creation of some new senior posts. The operational and investigational sides must be able to develop on their own and yet exchange ideas freely. To allow this to be done efficiently I have re-allocated certain responsibilities. The operational side of the Office is now entirely the responsibility of the Deputy Director (Forecasting) and the Deputy Director (Services), and the Deputy Director (Research) takes charge of all investigations. Climatology has been divided into two groups, one under the Assistant Director (Climatological Research) who is responsible to D.D.M.O.(R) and one under the Assistant Director (Climatological Services), who comes under D.D.M.O.(F) (this underlines the fact that the provision of climatological advice to industry, agriculture, etc., is becoming more closely linked with forecasting than before). The three Senior-Principal-Scientific-Officer posts in the Forecasting Division have been abolished, and in future the operations room at Dunstable will be controlled by the Assistant Director (Central Forecasting) under D.D.M.O.(F).

The substantial increase in the past few years of specialized forecasting and advisory services for Government departments, public corporations, industry and commerce, and recent developments in the use of broadcasting, both sound and television, have shown the need for an officer of senior grade, on the staff of D.D.M.O.(F), to devote his undivided attention to these matters. It is only by the establishment of personal relationships with inquirers and users that their meteorological problems can be fully appraised. A new post, that of Assistant Director (Public Services) has therefore been created. A.D.M.O.(P.S.) will be given the responsibility of watching, on behalf of D.D.M.O.(F), the public need and how it is being met. It is my hope that in this way it will be possible to make our work of greater use, and greater interest, to the nation as a whole.

On the research side, the Forecasting Research Division will come under D.D.M.O.(R), but the Assistant Director (Forecasting Research) will continue to give advice to the Forecasting Division when requested. The Marine Superintendent and the Marine Branch will, in future, be directed by D.D.M.O.(F), but with the provision that research in marine climatology will be supervised by D.D.M.O.(R), when requested to do so by D.D.M.O.(F).

The general effect of these changes is to give expression to the principle that meteorology, although covering an enormous field, is essentially a whole. To separate one branch of the subject from another is to restrict progress everywhere—the climatologist has much to give the synoptician and the forecaster can contribute greatly to climatology. I believe this to be true in both the operational and investigational sides of the Office, and the present re-allocation of posts is, I hope, a step in the right direction.

Meteorological Committee
Air Ministry

M.C.-53.

Geophysical Work carried out by the Meteorological Office.

At present, the Meteorological Office has responsibility for three geophysical subjects, namely, atmospheric electricity, terrestrial magnetism and seismology. However, since 1939 it has been official policy to soft-pedal geophysical activities within the Office, and in seismology, for example, work has been limited to the routine changing and analysis of records.

I consider that the present situation is unsatisfactory. Atmospheric electricity has some bearing on meteorology, but terrestrial magnetism and seismology have virtually no connection therewith. I think it wrong for the Meteorological Office to appear to have an interest in the two latter subjects by taking records without any attempt to undertake serious scientific work. Advances in these subjects can now only be made by first-rate scientists, and I would not be prepared to use any of my few first-rate men on these jobs. There are far too many urgent unsolved problems in meteorology to afford this luxury.

After a request by the National Committee for Geodesy and Geophysics for a new seismological station in Scotland, approaches were made, with the approval of U.S. of S., to the National Committee, to D.S.I.R., and to the Astronomer Royal, with a view to the transfer of responsibility for seismology and terrestrial magnetism to more appropriate bodies. The results of these enquiries showed clearly that no organisation wants to accept responsibility for these subjects. However, the sub-committee appointed by the National Committee for Geodesy and Geophysics to consider this matter decided to recommend the Royal Society to draw the attention of the University Grants Committee to the fact that the science of seismology was languishing and to invite the University Grants Committee to consider what could be done to support the subject at some suitable centre, such as the Department of Geophysics at Cambridge.

Pending the finding of Organisations willing to accept responsibility for terrestrial magnetism and seismology, I propose that the Meteorological Office continues to maintain its work in Geophysics at Kew, Eskdalemuir and Lerwick (maintenance of instruments and the making of routine observations), but that no new commitments be accepted.

O.G. SUTTON.

Director.

Meteorological Office,
Air Ministry, London, W.C. 2.
June, 1954.

M.C.-54

METEOROLOGICAL COMMITTEE

AIR MINISTRY

Annual Report of the Meteorological Committee to the Secretary of State for Air for the period 1st July, 1953, to 30th June, 1954

1. The Meteorological Committee met on 15th June, 1954. As in previous years the formal meeting due to be held in the autumn was not convened as there were no matters requiring discussion at a formal meeting. Information to which it was necessary to draw the attention of the Committee was communicated by letter.

2. *Membership.* The following changes have taken place in the membership during the year:-

> Sir David Brunt, F.R.S., and Professor H.S.W. Massey, F.R.S., have succeeded Professor G.M.B. Dobson, C.B.E., and Dr. O.G. Sutton, C.B.E., as representatives of the Royal Society.
>
> Major-General R.W. Goodbody, C.B., D.S.O., has replaced Major-General K.F. MacK. Lewis, C.B., D.S.O., M.C., as the War Office representative.
>
> Mr. W. Lewis has succeeded Mr. H.R. Smith, C.B., as the representative of the Scottish Office.
>
> Mr. G.M. Macintosh, O.B.E., has replaced Mr. G.W. Stallibrass, O.B.E., as a representative of the Ministry of Transport and Civil Aviation.
>
> Air Marshal T.G. Pike, C.B., C.B.E., D.F.C., has succeeded Air Marshal Sir Ronald Ivelaw-Chapman, K.C.B., K.B.E., D.F.C., A.F.C. as the representative of the Air Staff.

3. *Appointment of Director.* Dr. O.G. Sutton, C.B.E., F.R.S. succeeded Sir Nelson Johnson, K.C.B. as Director of the Meteorological Office on 1st September, 1953.

4. *Changes in the structure of the Meteorological Office.* Some re-allocation of posts has been made within the Deputy Directorate for Research and the Deputy Directorate for Forecasting. The main purpose of the changes is to group under the Deputy Director (Research) all branches which exist primarily for research and to transfer to the Deputy Director (Forecasting) certain branches formerly controlled by the Deputy Director (Research) whose major function is operational. Three new Assistant Director posts have been created to be in charge of Central Forecasting, Climatological Research and Public Services.

5. *Annual Report of the Director of the Meteorological Office.* The Committee received the Annual Report of the Director of the Meteorological Office for the year 1st April, 1953, to 31st March, 1954, and presented it (after amendment) to the Secretary of State for Air.

6. *Broadcasting of Meteorological Information.* The Committee is gratified to note that the measures approved last year for improving the presentation and broadcasting of weather forecasts have now been introduced in the normal B.B.C. daily programmes. Discussions will take place shortly with the British Broadcasting Corporation to improve still further the service in the sound radio programmes. The presentation of forecasts by members of the Meteorological Office staff in the television service has proved successful.

The Committee regrets to learn that despite prolonged examination of the problem, it has not yet been possible to arrive at an arrangement for the re-

/establishment

establishment of the Airmet or similar service. The Committee considers that the presentation of a more satisfactory service should continue to be pursued.

7. Staffing of the Meteorological Office. There was little change throughout the year in the staff position. The serious shortage in the Scientific Officer grade continued. Talks on careers in the Meteorological Office were given at a number of universities.

8. Vacation students. Applications for attachment to the Meteorological Office during the 1953 summer vacation were received from 38 students at 17 universities. From these 38 students, 12 were selected for attachment to the Meteorological Office.

9. Meteorological Research. The Committee took note of the Report of the Meteorological Research Committee for the year ended 31st March, 1954. The Committee is pleased to note that despite the many other expanding commitments of the Meteorological Office and staffing difficulties, the number of staff on research duties has not been appreciably reduced, and urges that the research staff of the Office should be increased as soon as practicable. The Committee notes the progress which has been made in the development of instruments for measuring meteorological elements at great heights; the development of numerical methods in weather forecasting and considers that this should be strongly supported; and the statistical analysis of upper winds, pressure contours, temperature and tropopause topography over the world. The Committee is also pleased to note that a Canberra aircraft has been made available for the Meteorological Research Flight and that investigations can now be extended up to 50,000 feet.

10. Arrangements have been made for the Meteorological Office to take over the work of the Snow Survey of Great Britain which the British Glaciological Society has found they could no longer maintain.

11. Report of the Director of the Naval Weather Service. The Committee received and took note of the abridged Report of the Director of the Naval Weather Service, Admiralty, for the year 1st April, 1953, to 31st March, 1954.

12. The Advisory Committee on Meteorology for Scotland will meet on 15th July, 1954, at the Meteorological Office, Edinburgh. The following changes have taken place in the membership during the year:-

Sir Edward Appleton, G.B.E., K.C.B., F.R.S. has been nominated to fill the vacancy in the representation of the University of Edinburgh.

Mr. Alex. Paton has succeeded Mr. A.R. Wannop, O.B.E. as the representative of the Department of Agriculture for Scotland.

13. International Meteorology. The Committee noted the continued activities of the Meteorological Office in the field of international meteorology.

26th August, 1954.

(Sgd.) GEORGE WARD
Chairman

METEOROLOGICAL COMMITTEE

AIR MINISTRY

Record of action following the cancellation of arrangements made for a meeting of the Meteorological Committee on 21st June, 1955

1. A meeting of the Meteorological Committee had been arranged to take place on Tuesday, 21st June, 1955 at 11 a.m., but in view of the exceptional circumstances which prevailed prior to the date of the meeting owing to the railway strike, and in view also of the illness of the Director, the Chairman reluctantly decided to cancel the arrangements made for the formal meeting of the Committee. At the same time the Chairman instructed that the papers which had been prepared for the meeting should be sent to members for their information and comments. The papers are listed below.

(a) Annual Report of the Director of the Meteorological Office for the year 1st April, 1954 to 31st March, 1955. (M.C.-55).

(b) Annual Report of the Director of the Naval Weather Service, 1st April, 1954 to 31st March, 1955. (M.C.-56).

(c) Report of the Meteorological Research Committee for the year ended 31st March, 1955. (M.C.-57).

(d) Draft Annual Report of the Meteorological Committee to the Secretary of State for Air for the period 1st July, 1954 to 30th June, 1955. (M.C.-58 (draft)).

(e) Gassiot Committee - Annual Reports for Kew and Eskdalemiur Observatories. (M.C.-59).

(f) International Meetings (July, 1954 to June, 1955). (M.C.-60).

2. Three of the papers, viz., those at (a), (d) and (e) above, required the approval of the Committee before action could proceed upon them, and members were requested to send any comments or amendments to the Secretary by 30th June, Unless members replied by that date it would be assumed that they had no observations to offer and that the papers were approved. Comments and amendments received from members are given in paragraphs 3-5 below.

3. Annual Report of the Director of the Meteorological Office for the year April 1st, 1954 to March 31st, 1955. (M.C.-55).

(a) Galley, page 3. Sir David Brunt pointed out an error in the list of members of the Meteorological Committee against the name of Sir Edward Salisbury, K.B.E. should read C.B.E.

(b) Galley, page 13. Mr. Campbell drew attention to the use of the phrase "Allied Exercises" in line 1, and suggested that some alternative wording should be used. It is proposed to amend the phrase to read "N.A.T.O. Exercises".

(c) Galley, page 15, Section (f). Special work. Mr. Bigg pointed out that the reference to the flight of Her Majesty the Queen and the Duke of Edinburgh to Nairobi in April and May 1954 was inaccurate. It was Entebbe and not Nairobi that was visited on that occasion and the paragraph should read "... Aden to Entebbe and Entebbe to El Adem.....".

(d) Galley, page 17, Section 9. Mr. Bigg mentioned that the wording of sub-paragraph (c) British West Indies appeared to be misleading as there are many members of the staff of the British Caribbean Meteorological Service who are not forecasters and who are not connected in any way with the Meteorological Office. Mr. Bigg suggested re-wording the paragraph as follows: "Many of the forecasters employed by the British Caribbean Meteorological Service are seconded from the Meteorological Office, although ...".

/(e)

(e) Galley, page 56, Appendix II. Mr. Campbell drew attention to printing errors in the heading of this appendix.

(f) Mr. Bigg also referred to Minute 1482 of the Minutes of the 169th Meeting of the Committee and regretted that the Annual Report of the Director contained no reference to research in tropical meteorology. He suggested that even if no action was possible in the year under review it would be desirable to give an indication in the Annual Report that the importance of the subject had not been overlooked. It is therefore proposed to insert a new paragraph under Section 4 - Research and Development (Galley, page 33) as follows:-

> "(e) Tropical Meteorology. The special problems of tropical regions received much attention in the climatological research branches."

Subject to the above amendments which were communicated to the Secretary, the Annual Report of the Director of the Meteorological Office for the year April 1, 1954 to March 31 1955 was accepted by the Committee.

4. Annual Report of the Meteorological Committee to the Secretary of State for Air for the period 1st July, 1954 to 30th June, 1955. (M.C.-58).

Professor Sheppard referred to para. 9 of the draft Annual Report about vacation students and enquired whether the cost of the scheme was a reason why only twelve students out of forty-four applicants were accepted for attachment to the Meteorological Office in 1954. He suggested that, if this was so, a sentence should be added to the effect that the Committee recommends a fuller use of this scheme as an aid to recruitment to the Scientific Officer class and to the development of interest in the science in this country.

Professor Sheppard was informed that the number of students attached to the Meteorological Office during summer vacations is limited to twelve students because of the restricted number of research branches and research units to which a student could profitably be attached. The cost of the scheme is not taken into consideration in deciding the matter; the number accepted depending upon the facilities available in the Meteorological Office. The paragraph does not therefore require amendment as suggested by Prof. Sheppard.

The draft Annual Report was approved by the Committee without amendment.

5. Annual Reports for Kew and Eskdalemuir Observatories for submission to the Gassiot Committee of the Royal Society. (M.C.-59).

The Committee noted and approved the Annual Reports on the work carried out at Kew and Eskdalemuir Observatories during the year 1st April, 1954 to 31st March, 1955 (Appendices I and II to M.C. - 59) which had been submitted to the Committee before being transmitted to the Royal Society for circulation to members of the Gassiot Committee.

6. The following change in the membership of the Committee was notified.

Mr. R.W.N.B. Gilling has succeeded Captain J. H. Quick, O.B.E. as one of the representatives of the Ministry of Transport and Civil Aviation.

Meteorological Office,
Air Ministry, London, W.C.2.
July, 1955

G.23373/(a)/JEK/7/55/50

M.C. - 55

METEOROLOGICAL COMMITTEE

Annual Report
of the Director of the
Meteorological Office
presented by the Meteorological Committee
to the Secretary of State for Air
for the year
April 1st, 1954 to March 31st 1955.

The Annual Report which was previously circulated in proof stage was accepted, subject to amendments, by the Committee - see para. 3 of the "Record of action following the cancellation of arrangements for a meeting of the Meteorological Committee on 21st June 1955."

M.C-56

ANNUAL REPORT

OF THE

DIRECTOR NAVAL WEATHER SERVICE

1st April, 1954, to 31st March, 1955.

For Members of the Meteorological Committee

Section A.	GENERAL
B.	TRAINING
C.	WEATHER MESSAGE ORGANISATION
D.	PUBLICATIONS AND CLIMATOLOGY
E.	INSTRUMENTS AND EQUIPMENT
F	INVESTIGATIONS

SECTION A - GENERAL

1. **Liaison with other Services.** Close liaison with all departments of the Air Ministry Meteorological Office was maintained throughout the year, and on overseas stations, liaison was maintained with other meteorological services by the appropriate Fleet Meteorological Officers.

2. **Forecast Section, Admiralty.**

(a) Routine Weather Messages

(i) Routine Fleet Weather Messages prepared by Forecast Section, Admiralty, are transmitted daily for the benefit of ships in Home Waters. These messages comprise thrice daily Fleet Synoptic Messages, twice daily Fleet Analysis Messages and twice daily Fleet Forecast Messages. The area covered by these Fleet Weather Messages and their contents are varied as necessary to ensure that the units at sea obtain the best available information for their particular areas.

(ii) Gale Warning Messages and Strong Upper Wind Warnings are issued for the Home Station in conjunction with the Central Forecasting Office, Air Ministry.

(b) Special Weather Messages and Forecasts

(i) Special Synoptic Messages have been transmitted for the benefit of Meteorological Officers appointed to four Fishery Protection Vessels for experience of forecasting in Arctic waters. These messages have contained surface and upper air data to supplement those given in the routine Fleet Weather Messages. In addition forecasts for their areas have been prepared by Forecast Section and transmitted to these ships for verification.

(ii) During the year a large number of requests have been received for special forecasts A number of these have been met by adding forecasts for the requisite areas to the routine Home Fleet Forecast Messages. The remaining requests have been met by passing a total of 2336 forecasts in special signals addressed only to the authorities concerned. These forecasts have included, among others, those supplied to Flag Officer, Royal Yachts, covering the passage from Gibraltar to London of H.M.Y. "Britannia" at the conclusion of Her Majesty the Queen's Commonwealth Tour, sea and swell forecasts for the southern North Sea in connection with combined Naval/Coastal Command exercises and forecasts covering towing operations either coastal or between United Kingdom ports and Gibraltar.

3. **Home Air Command**

There has been no change in the functions of the three meteorological centres at Lee-on-Solent, Culdrose, and Abbotsinch, each continuing to act as an advisory and analysis centre for a number of satellite stations These centres receive channel I, channel II and the North Atlantic teleprinter broadcasts from Dunstable, whilst the satellites receive only channel I. In addition, the naval teleprinter network enables hourly actuals and terminal forecasts to be collected from the satellite stations and the collectives exchanged between centres for re-broadcast to all satellites. The meteorological centre at Abbotsinch undertakes the bulk of the upper air analysis and forecasting.

4. **Mediterranean**

The Fleet Weather Centre at Malta issues gale warnings and forecast messages to H.M. Ships and also broadcasts a synoptic message of basic data for the use of cruisers and aircraft carriers with meteorological organisations. It provides gale warnings and forecasts to merchant shipping on behalf of the Meteorological Office.

5. Far East

Fleet Weather Messages are prepared by the Malayan Meteorological Service for broadcast from Singapore and by the Royal Observatory for broadcast from Hong Kong.

6. East Indies, South Atlantic and America and West Indies Stations

H.M. Ships on the East Indies and South Atlantic stations are provided for by re-broadcasts of information supplies by national meteorological services. On the America and West Indies station ships read appropriate American and Canadian broadcasts direct.

7. Turbulence Reports

Reports of severe clear air turbulence experienced by naval aircraft have been forwarded to the Meteorological Office.

SECTION B - TRAINING

8. R.N. School of Meteorology

Qualifying courses for both officers and ratings are held at the R.N. School of Meteorology, H.M.S. HARRIER, Kete, Pembrokeshire. Those for officers are of 22 weeks duration, which includes 2 weeks practical training at Naval Air Stations, whilst courses for ratings last 8 weeks.

In addition shorter acquaintance courses are held for officers not specialising in meteorology.

9. R.N.V.R.

R.N.V.R. Meteorological Officers, in general, undertake 2 weeks annual training and during this period they may be employed in a sea-going ship with a meteorological organisation, or at a Naval Air Station. Some R.N.V.R. Meteorological Officers and ratings also carry out week-end duties with R.N.V.R. air squadrons.

SECTION C - WEATHER MESSAGE ORGANISATION

10. General

Details of meteorological broadcasts likely to be required by H.M. Ships at sea are listed in "Radio Weather Messages" (W.7). This publication also gives details of the W.M.O. international and regional codes. The "Admiralty List of Radio Signals" Vol. III gives details of the meteorological services available to shipping generally and Vol. IV lists the meteorological observing stations throughout the world.

The normal arrangements for passing meteorological information to H.M. Ships are:-

(i) Small ships without meteorological organisations are provided for by gale warnings and forecast and analysis messages placed on the appropriate ship broadcasts.

(ii) Ships with part-time meteorological organisations read broadcasts of surface synoptic data and upper air information selected by the Fleet Weather Centres.

(iii) In addition to reading the above, ships, such as aircraft carriers, having full-time meteorological organisations read appropriate national or regional broadcasts in order to obtain the full up-to-date information necessary for flying operations.

11. Codes

The ballistic Meteor Code published in M.O. 317, "Instructions for the Preparation of Artillery Meteor Reports" has now been adopted for use in the Royal Navy.

SECTION D - PUBLICATIONS AND CLIMATOLOGY

12. Publications

(a) N.W.S. Memoranda

The following have been printed and issued:-

N.W.S. memo. 150A/53 - Estimation of Ballistic temperatures at sea - Persian Gulf and Aden area

N.W.S. memo. 154/54 - Radar Weather echoes and their application to weather forecasting.

(b) Sailing Directions and Weather Handbooks:-

(i) The meteorological currents and ice sections of the following Admiralty Pilots, have been revised in conjunction with the Meteorological Office, Air Ministry:-

Irish Coast Pilot	
Mediterranean Pilot	Vol. IV
West Indies Pilot	Vol. I
West Indies Pilot	Vol. II
Persian Gulf	
Black Sea	

Revision of South America Pilot, Vol. II is in hand.

(ii) There has been further delay in the completion of the revision of the handbook "Weather in the Mediterranean" due to staff changes in the Meteorological Office. Every effort is now being made to complete this as soon as possible.

(iii) Arrangements are in hand for the revision of the Greenland and Barents Seas section of the Handbook "Weather In Home Waters".

(iv) Work on a new edition of Monthly Meteorological Atlas for the Greenland and Barents Seas has been completed and delivery by the printers is expected shortly

(v) The report "Sea and River Ice Conditions North of the U.S.S.R". which was completed for Admiralty by a member of the Scott Polar Research Institute is still in preparation for printing.

(vi) The following new editions of Naval Weather Service publications have been prepared and issued:-

W2 and W3	Meteorological Code and Decode cards
W5a	Aviation forecast form
W12	Combined map and forecast form
W13	Pilot Balloon Ascent
W15	International Analysis Code (Fleet)
W11a	The Confidential Supplement to the Naval Weather Service Handbook - has been prepared.

(vii) The following new publications of Meteorological Office Air Ministry origin have also been distributed

M.O. 555	Upper Air Data for Aden
M.O.535i	Sea breezes at North Front Gibraltar.

13. Climatology

(a) During the year forty-six climatological appreciations reports and answers have been prepared for the Naval Staff, Admiralty Departments and other Naval authorities.

(b) Liaison in the matter of sea statistics in their relationship to survival in the open sea has been maintained with the R.N. Personnel Research Committee.

SECTION E - INSTRUMENTS AND EQUIPMENT

14. General. Preliminary and final inspections were carried out in ships building and refitting and advice was given on the resiting of instruments of ships already in commission. Mutual exchanges of equipment were arranged with the Meteorological Office of the Air Ministry, with whom a close liaison on instrumentation was maintained.

/15.....

15. Facsimile. Developments in the use of meteorological facsimile equipment were continued and more ships now have the necessary receiving apparatus. Courses in the use and maintenance of the equipment were given to officers and ratings at Muirhead's Electrical Works.

16. The positioning of the anemometer on board ship has been causing many difficulties and investigations are under way to find the best position for the anemometer cups and vane.

17. Films. Several films and film strips were viewed and, where appropriate, ordered for film libraries at home and abroad.

SECTION F - INVESTIGATIONS

18. The Director of the Naval Weather Service was represented on the Meteorological Research Committee and its three Sub-committees. During the year 12 meetings were held and 45 papers were discussed.

19. A paper entitled "Some Comments on a Basic Formula used in certain Contrail calculations" and written in the Department was submitted to the Meteorological Research Committee for consideration.

20. The Director of the Naval Weather Service was represented on the Tropospheric Wave Propagation Committee which held two meetings during the year, and at the meeting of the International Association of Meteorology held in Rome in September, 1954.

21. During the course of the year memoranda on the following subjects have been written and will shortly be issued:-

(a) Single Observer Forecasting in Temperate Latitudes

(b) Computation of Upper and Ballistic Winds

(c) Condensation Trails

22. The accumulation of Naval Air Stations meteorological data on Hollerith Cards continues.

23. Technical advice on a number of subjects has been given to Divisions of Naval Staff and Admiralty Departments.

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METEOROLOGICAL COMMITTEE

Report of the Meteorological Research Committee
to the
Secretary of State for Air
for the year ended 31st March , 1955.

The Report of the Meteorological Research Committee (M.R.P. 910A) which was previously circulated, was noted by the Committee - see "Record of action following the cancellation of arrangements made for a meeting of the Meteorological Committee on 21st June, 1955."

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METEOROLOGICAL COMMITTEE

AIR MINISTRY

Annual Report of the Meteorological Committee to the Secretary of State for Air for the period 1st July, 1954 to 30th June, 1955

1. A meeting of the Meteorological Committee had been arranged for 21st June, 1955, but in view of the exceptional circumstances which prevailed prior to the date of the meeting because of the railway strike and also in view of the illness of the Director, it was reluctantly decided to cancel the arrangements made for this meeting. However, the papers prepared for the meeting were circulated to members for their information and comment.

2. Membership. The following change has taken place in the membership of the Committee during the year:-

Mr. R.W.N.B. Gilling has succeeded Captain J.H. Quick, O.B.E., as one of the representatives of the Ministry of Transport and Civil Aviation.

3. Annual Report of the Director of the Meteorological Office. The Committee received the Annual Report of the Director of the Meteorological Office for the year 1st April, 1954 to 31st March, 1955, and presented it (after amendment) to the Secretary of State for Air.

4. Appointment of Senior Officers in the Meteorological Office. One of the Deputy Directors, Mr. J. Durward, C.M.G., retired on 31st December, 1954. A sub-committee of the Meteorological Committee recommended the promotion of Dr. A.C. Best, O.B.E., to the grade of Deputy Chief Scientific Officer to fill the resulting vacancy. As Chairman of the Meteorological Committee I approved this recommendation.

5. Appointment of a Committee to review the organisation of the Meteorological Office. Early in 1955 a special Committee was set up to review the work and organisation of the Meteorological Office in relation to current and future requirements. The Committee is under the chairmanship of Lord Brabazon of Tara, and its members are Sir Charles Darwin, K.B.E., M.C., F.R.S., Major R.H. Thornton, M.C., Sir Folliott Sandford, K.B.E., C.M.G., and Mr. J.R. Simpson, C.B. The Committee held its first meeting on 31st March, 1955.

6. Centenary of the Meteorological Office. The Meteorological Office celebrates its centenary in 1955. To mark the occasion arrangements have been made for a Forecasting Unit to visit five principal cities in the United Kingdom, viz., London, Edinburgh, Manchester, Birmingham and Cardiff, for approximately fourteen days each during the months of June to September. Accommodation for the unit has been provided by arrangement with a well known store in each city. The unit will demonstrate to the public the operation of a forecast office and how forecasts are prepared. The display includes meteorological instruments and their operation and use will be explained to visitors. With the co-operation of Her Majesty's Stationery Office souvenir weather charts and forecasts will be prepared each day and reproduced for sale to the public. An ocean weather ship on its way to take up its normal station will visit Edinburgh and Cardiff during the time the Forecasting Unit is at these places. The ship will be open to public inspection and will stay three days at Edinburgh and two days at Cardiff. The Committee wishes to stress the great value of publicity of this kind which serves to educate the public on the internal working of the Meteorological Office.

Arrangements have also been made with the General Post Office for the display of a poster giving the meteorological offices from which members of the public can obtain local forecasts. The poster will be displayed during the month of June in all Post Offices in the United Kingdom.

/7.

7. Provision of a Telephone Weather Service. The Committee is gratified to note that as a result of discussions with the Postmaster General approval has been given for the introduction of an automatic telephone weather forecasting service. It will start in London as soon as the necessary equipment has been installed, which will probably be early next year. The forecasts will cover an area of roughly twenty miles radius round the centre of London, and will be changed as necessary. They will be recorded on special equipment which subscribers on London automatic exchanges will be able to reach by dialling WEA, followed by four numerical digits, in the same way as they dial any other. call in the London area. This service will also be available to subscribers outside London. The charge for these WEA calls will be the same as for ordinary calls to central London. The Post Office is planning the extension of the service later to other parts of the country, wherever this is justified.

8. Staffing of the Meteorological Office. There was little change throughout the year in the staff position. The shortage in the Scientific Officer grade continued. The Committee welcomes the efforts being made by the Director to stimulate interest by lectures at Universities. The effects of regular recruitment of Assistants (Scientific) were offset by the high rate of resignation and a deficiency of experienced assistant staff persists.

9. Vacation Students. Applications for attachment to the Meteorological Office during the 1954 summer vacation were received from 44 students at 15 universities. From these 44 students, 12 were selected for attachment to the Meteorological Office.

10. Meteorological Research. The Committee took note of the Report of the Meteorological Research Committee for the year ended 31st March, 1955. The Committee is pleased to note that despite difficulties caused by shortage in the Scientific Officer grade (see para. 8) the research effort has been expanded by the creation of an Assistant Directorate in Climatological Research and the strengthening of the research staff at Porton. The Committee notes the progress which has been made in the investigation of methods of forecasting using an electronic computing machine and based on dynamical principles: it welcomes the increase in the research staff allotted to this investigation, and, also the arrangements made with the Chief of the United States Weather Bureau for an officer to visit Washington for one year to see the inception and operation of the Numerical Prediction Unit there. The Committee also notes the research in progress on aviation problems including forecasts of winds at 40,000 feet and 50,000 feet; the investigation of humidity and temperature up to heights of 15 km., and the development of meteorological instruments for use on high speed aircraft. The Committee strongly supports the special recommendations made by the Meteorological Research Committee for the provision of an electric computer for the sole use of the Meteorological Office for research purposes, particularly the development of numerical methods of weather forecasting and the provision, in about a year's time, of an aircraft capable of attaining a height of 60,000 feet for the Meteorological Research Flight.

11. An investigation in the Cardington-Bedford area has been planned to obtain detailed information about the time and area distribution of intense falls of rain. A close network of recording rain-gauges, electrically synchronised, will give minute to minute data for an area of about four square miles. The results will provide information in a new form applicable to problems of storm-water drainage at present under investigation by the Department of Scientific and Industrial Research and the Industrial Research Road Research Laboratory.

12. In view of the public interest, expressed in Parliament, on the question of water supplies, the Committee welcomes the preparations which are in hand for field trials to test the effectiveness of suggested methods for increasing rainfall on an economic scale and for research to be undertaken into large-scale diffusion of airborne particles and into the distribution of natural atmospheric nuclei which enter into the precipitation process. A few initial tests of items of technique have been made. This programme is expected to extend over a considerable time and is likely to be modified as experience accumulates.

/13.

13. Report of the Director of the Naval Weather Service. The Committee received and took note of the abridged Annual Report of the Director of the Naval Weather Service, Admiralty, for the year 1st April, 1954 to 31st March, 1955.

14. International Meteorology. The Committee noted the activities of the Meteorological Office in the field of international meteorology during the year.

(Sgd.) GEORGE WARD

Chairman

1st September, 1955

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METEOROLOGICAL COMMITTEE

AIR MINISTRY

Annual Reports for Kew and Eskdalemuir Observatories for submission to the Gassiot Committee of the Royal Society

1. The Meteorological Committee is required to report annually to the Gassiot Committee on the use made of the income from the Gassiot Trust for magnetic and meteorological observations or other physcial investigations in accordance with the terms of the Trust. For this purpose annual reports on the work carried out at Kew and Eskdalemuir Observatories are sent to the Royal Society for circulation to the Gassiot Committee. A sum of £593 13s. 2d being the income of the Gassiot Fund for 1954, has been received by the Air Ministry from the Royal Society.

2. Accordingly, reports for the year ended 31st March, 1955, for Kew Observatory and Eskdalemuir Observatory are submitted at Appendices I and II for approval by the Meteorological Committee.

O. G. SUTTON
Director

Meteorological Office,
Air Ministry, London, W.C.2.
May, 1955.

Gev.17985/JB/5/55/50

Air Ministry, Meteorological Office

KEW OBSERVATORY

Annual Report for the year 1st April, 1954 to 31st March, 1955

1. Meteorological Observations and Records. - Autographic records of atmospheric pressure, dry-bulb and wet-bulb temperature, wind, rainfall, sunshine and evaporation, together with standard measurements of certain of these elements and of grass minimum and earth temperature, cloud, visibility, and weather, were maintained according to normal procedure. A night-sky recorder was operated regularly. Records of atmospheric pollution were obtained from an Owens automatic filter and from a Department of Scientific and Industrial Research smoke filter. An early model of the Campbell-Stokes sunshine recorder was replaced by a modern instrument more readily adjustable.

Tabulations were prepared for the Observatories' Year Book and other official publications. A weekly statement of observations was distributed to meet the needs of inquirers.

Details of the routine observations made at the Observatory are given in the Appendix to the Annual Report for 1951 - 52.

2. Measurement of Solar Radiation. - Continuous records of solar intensity, total and diffuse radiation on a horizontal surface, and illumination of a horizontal surface were maintained. Analysis of the first five years' record continued, and reports were prepared. In addition to providing climatological information this analysis confirmed the mutual consistency of the various records and yielded estimates of the tramsmission and absorption of the cloudless atmosphere at Kew. It is hoped to check these estimates later by measurements in the air.

The exposure of the horizontal surface radiation instruments was greatly improved by the construction of a platform round the anemometer mast above the dome. At the same time new and more powerful hiliostats were provided for the thermopiles of the solar intensity instruments. Construction of an illumination recorder designed to be free from temperature and cosine law errors was begun, but there was inordinate delay in the supply of the necessary optical filter.

Solarimeters were mounted above and below a Hastings aircraft of the Meteorological Research Flight with the intention of measuring the albedo of clouds and of the earth's surface. A number of interesting records were obtained and reduced.

The number of inquries concerning solar radiation continued to increase. During the period there were contacts involving substantial effort with the British Electricity Authority, Imperial College, East Malling Research Station, Rothamsted Experimental Station, National Institute of Agricultural Engineering, Building Research Station, Road Research Laboratory, Fuel Research Station, Armament Research Establishment, National Institute of Oceanography and Falkland Islands Dependencies Survey.

3. Fog and Visibility Investigation. - An instrument to measure the liquid water content of fog was designed and constructed, the principle of operation being a comparison of the specific heats of foggy air during and after evaporation of the droplets. Development of this instrument continues. A heat-insulated chamber of about 30 cubic metres is under construction to allow testing of this and similar instruments in artificial fog.

A simple method of measuring visibility at night, involving a judgement of equality rather than of extinction, was evolved and tests were begun.

/4.

4. Micrometeorological Investigations. - In an attempt to resolve previously reported difficulties in determination of the vertical convective heat flux by a simultaneous observation of wind and temperature fluctuations, a joint investigation with the Meteorological Office Unit at the School of Agriculture, Cambridge was planned. This involved the direct determination of all terms in the heat balance of the surface except the convective heat loss, and of the surface drag, at the same time as the mean wind, temperature, and humidity profiles, and the wind and temperature fluctuations of periods down to about 1/10 second. An open site at Cardington was occupied. Unfortunately the observations were seriously curtailed by unsuitable weather and conclusive results were not obtained. The record so far reduced indicates that the transfer of momentum computed from the wind fluctuations at 1.5 metres agrees with the drag at the surface, and that the convective heat flux is probably determined correctly by the fluctuations method. This result could not be obtained on the Kew site. Further work will be needed to confirm this. Arrangements were made with the Mathematical Services Division, Royal Aircraft Establishment to compute certain statistics of the series of wind and temperature of observations.previously obtained. Some of the series were transferred to punched cards for this purpose.

A full year of continuous record of the components of the heat balance of the surface was completed at the end of May, 1954, and the results were being studied. The apparatus was dismantled.

5. Atmospheric Electricity. - Continuous photographic records of the electrical potential gradient were obtained. Measurements of the potential gradient and the air-earth current were made on suitable days.

6. Seismology. - The Galitzin seismographs (two horizontal components and one vertical component) were re-standardised in August, 1954, and the short-period vertical component instrument was adjusted. The Monthly Seismological Bulletin, which is widely distributed to other institutions, included particulars of 343 earthquakes recorded at Kew, the epicentres of 123 being determined. Copies of seismograms were supplied at the request of several observatories in other countries.

The staff of the International Seismological Summary continued to be accommodated in the Observatory.

7. Miscellaneous. - Climatological and other enquiries averaged about 200 per month. A number of visitors and school parties were shown the work of the Observatory. Several overseas visitors were entertained in the weeks following the General Assembly of the International Union of Geodesy and Geophysics in Rome.

The installation of the new heating system was completed early in the period.

Meteorological Office
Air Ministry, London, W.C.2.
April, 1955.

Gev.17985/JB/5/55/75

Air Ministry, Meteorological Office

ESKDALEMUIR OBSERVATORY

Annual Report for the year 1st April, 1954 to 31st March, 1955

1. Meteorological Observations and Records. - The normal instrumental and other observations were made for synoptic and climatological purposes. Autographic registration of atmospheric pressure, dry-bulb and wet-bulb temperature, wind, rainfall and sunshine was maintained. A night-sky (pole star) recorder continued in operation. Hourly values of the meteorological elements were tabulated, and material for the Observatories' Year Book was prepared.

Records of atmospheric pollution, by smoke filter, were obtained for the Director of Fuel Research, Department of Scientific and Industrial Research.

Details of the routine observations made at the Observatory are given in the Appendix to the Annual Report for 1951-52, as amended in the Annual Report for 1952-53.

2. Solar Radiation. - Recording of total and diffuse solar radiation continued during the year, a system of varying the circuit resistance with season being introduced to improve the accuracy of low intensity measurements. A bi-metallic pen recorder of total radiation, modified at Kew Observatory, was operated from July, 1954.

3. Atmospheric Electricity. - Photographic records of potential gradient were maintained throughout the year and standardised by regular absolute measurements. The electrometers used were standardised. The records were tabulated for publication.

4. Terrestrial Magnetism. - Absolute observations of the magnetic elements were made at least thrice weekly. Magnetic declination was measured with a Kew-pattern unifilar magnetometer. Horizontal force was measured with a Schuster-Smith coil magnetometer: quartz-fibre megnetometers Q.H.M. 119 and 120 were also used for frequent horizontal force measurements. The suspension of Q.H.M. 119 was broken in transit between Lerwick and Eskdalemuir in August, 1954: it was brought into use again in February, 1955 following repair in Denmark. Q.H.M. 120 was used regularly till August, 1954 when it was sent to Lerwick. Measurement of magnetic dip by the Schulze Inductor 103 was resumed in April, 1954 after a general overhaul of the instrument. Balance magnetometer BMZ 35 was used throughout to measure vertical force and BMZ 53 was used till August, 1954 when it was returned to the Department of Geodesy and Geophysics, Cambridge University.

A series of horizontal force and vertical force measurements was made with Eskdalemuir instruments during a visit to Abinger in July, 1954 to aid in comparisons between Abinger, Eskdalemuir and Lerwick.

Declination, horizontal force and vertical force were recorded continuously by two sets of la Cour magnetographs, ordinary-run and quick-run. A supplementary Adie set of lower sensitivity was also operated: modifications were made to the latter to ensure the full recording of the greatest storms. The level of magnetic disturbance was low throughout the year: all recording was satisfactory.

Dover magnetometer 140 was overhauled and a re-determination made of the moment of inertia of its magnet prior to the despatch of the instrument for use in the Argentine Islands.

A highly sensitive supplementary declination variometer was operated for a few days in June round the time of the solar eclipse: no clear evidence of a solar eclipse effect was found.

Various statistical studies were made of long period trends in the Eskdalemuir horizontal and vertical force base lines, and of comparisons of the standard with the supplementary absolute instruments.

A direct recording horizontal force variometer with photo-cell recording was brought into use in July, 1954.

The magnetic records were tabulated in preparation for inclusion in the Observatories' Year Book. Three-hourly disturbance indices, K, were measured and daily character figures assigned. Hourly values of declination were sent weekly to the Colliery Guardian and the Iron and Coal Trade Review. Photographic copies of the magnetic records were supplied on request to Germany and Holland, and to the National Coal Board and other inquirers. Notification of magnetic disturbance exceeding certain limits was sent to the Radio Research Station at Slough, the Marconi Company at Chelmsford and the Cavendish Laboratory at Cambridge.

5. Miscellaneous. - Visitors to the Observatory included parties of members of the Royal Meteorological Society and the Edinburgh Geological Society.

Meteorological Office,
Air Ministry, London, W.C.2.
April, 1955.

METEOROLOGICAL COMMITTEE

AIR MINISTRY

INTERNATIONAL MEETINGS (July, 1954 to June, 1955)

Members of the Meteorological Office staff attended the following meetings during the period July, 1954 to June, 1955.

1. WORLD METEOROLOGICAL ORGANISATION.

(a) Executive Committee, held in Geneva, 25th August to 11th September, 1954, attended by:-

The Director

(b) Meeting of the Sferics Working Group of Regional Association VI (Europe), held in Paris, 30th November to 2nd December, 1954, attended by:-

Mr A.L. Maidens

(c) Working Group of the Executive Committee on the Technical Division of the Secretariat.

The Director visited Geneva from 17th to 20th February, 1955, to inspect the work of the Technical Division.

(d) Executive Committee, held in Geneva, 12th to 13th April, 1955 attended by:-

The Director

(e) Second Congress, held in Geneva, 14th April to 13th May, 1955, attended by:-

The Director
Mr J. Durward
Cmdr C.E.N. Frankcom (part-time as President of the Commission for Maritime Meteorology)
Dr P.G.F. Caton

(Note:- The Congress was also attended by Instructor Captain P. Bracelin, Director of the Naval Weather Service).

(f) Executive Committee, held in Geneva, 13th to 17th May, 1955, attended by:-

Mr J. Durward (representing the Director)

2. INTERNATIONAL CIVIL AVIATION ORGANISATION

(a) Fourth Session of the Meteorology Division, held in Montreal, 15th June to 14th July, 1954, attended by

Mr W.H. Bigg
Mr P.J. Meade
Mr J.C. Cumming

/(b)

(b) Third North Atlantic Regional Air Navigation Meeting, held in Montreal, 5th to 29th October, 1954, attended by:-

Mr J.C. Cumming

3. INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS

Tenth General Assembly, held in Rome, 15th to 25th September, 1954, attended by:-

The Director	Mr J.S. Sawyer
Dr J.M. Stagg	Dr G.D. Robinson
Dr R.C. Sutcliffe	Mr J.M. Craddock

4. OTHER MEETINGS.

(a) Meeting of Swiss Commission for the Study of Hail - Research Work on Cloud Physics, held in Zurich, 4th to 9th October, 1954, attended by:-

Mr F.J. Murgatroyd

(b) Commonwealth Oceanographic Conference, held at the National Institute of Oceanography, Godalming, 18th to 22nd October, 1954, attended by:-

Dr G.D. Robinson
Cmdr C.E.N. Frankcom

(c) Meeting to discuss Meteorological Reporting Facilities over the North Sea, held in De Bilt, 7th and 8th February, 1955, attended by:-

Mr S.P. Peters

(d) Symposium on Atmospheric Condensation Nuclei, organised by the School of Cosmic Physics of the Dublin Institute of Advanced Studies, held in Dublin, 26th to 28th April, 1955, attended by:-

Mr G.J. Day

(e) Meeting to discuss investigations in Numerical Weather Prediction, organised by the Swedish Air Force Weather Service, held in Stockholm, 17th to 27th May, 1955, attended by:-

Mr F.H. Bushby

(f) Conference of Commonwealth Meteorologists, held in London, 23rd to 26th May, 1955, attended by various members of the Meteorological Office staff as necessary.

Meteorological Office,
Air Ministry, London, W.C.2.
June, 1955.

METEOROLOGICAL COMMITTEE

AIR MINISTRY

Record of action following the postponement of the meeting of the Meteorological Committee due to be held towards the end of May or the beginning of June, 1956

1. The Chairman reluctantly decided to postpone the meeting of the Meteorological Committee due to be held towards the end of May or the beginning of June, 1956 until later in the year when the report of the Special Committee appointed to review the work and organisation of the Meteorological Office is expected to be available. The Chairman, however, instructed that the papers which are normally prepared for this meeting should be sent to members for their information and comments. The papers are listed below.

(a) Annual Report of the Director of the Meteorological Office for the year April 1, 1955 to March 31, 1956 (M.C.-66).

(b) Annual Report of the Director of the Naval Weather Service, 1st April, 1955 to 31st March, 1956 (M.C.-65).

(c) Report of the Meteorological Research Committee for the year ended 31st March, 1956 (M.C.-64).

(d) Draft Annual Report of the Meteorological Committee to the Secretary of State for Air for the period 1st July, 1955 to 30th June, 1956 (M.C.-63 (draft)).

(e) Gassiot Committee - Annual Reports for Kew and Eskdalemuir Observatories (M.C.-61).

(f) International Meetings (July 1955 to June 1956) (M.C.-62).

2. Three of the papers, viz., those at (a), (d) and (e) above, required the approval of the Committee before action could proceed upon them, and members were requested to send any comments or amendments to the Secretary by the 16th July. Unless members replied by that date it would be assumed that they had no observations to offer and that the papers were approved. Comments and amendments received from members are given in paras. 3-4 below.

3. Annual Report of the Director of the Meteorological Office for the year April 1, 1955 to March 31, 1956. (M.C.-66).

(a) Galley, page 6. Mr. Gilling mentioned that the Report did not include any reference to the visual gale-warning service as it had done in previous years. It is proposed to insert the following sentence at the end of the paragraph relating to "Bulletins for broadcasting".

> "By arrangement with the Ministry of Transport and Civil Aviation and other bodies, visual gale-warning signals in the form of canvas cones were exhibited at many coastguard stations and other points on the coast."

(b) Galley, page 14. Mr. Bigg pointed out that the last paragraph of the report of the Deputy Director (Services) is not strictly accurate as no meteorological service in the Colonies is in fact provided by the Colonial Office, and suggested that line 2 of the paragraph should read "are provided by the Colonial Governments concerned, ..."
The Report is being amended accordingly.

(c) Galley, pages 15-17. Mr. Bigg expressed regret that the report of the Deputy Director (Research) contained no reference to research in tropical meteorology. He suggested that it would be desirable to insert a reference in the Annual Report to the arrangements made with the

/Colonial

G.9003/JEK/8/56/50

Colonial Office for a special study of the requirements for research in this subject. It is proposed to insert in Galley, page 15 after the second paragraph and before "Relations with the Universities" the following new paragraph.

> "COMMONWEALTH RELATIONS
>
> Through personal visits and correspondence advice on research problems continued to be sought by Commonwealth countries on a considerable scale. Arising from representations made by meteorological services in the Colonies, arrangements were made with the Colonial Office for a senior member of the research staff to make a special study of the requirements for research in tropical meteorology and to visit a number of colonial territories to discuss the problems with the Directors."

Mr. Bigg also suggested that a mention of this subject should be included in the Annual Report of the Meteorological Committee (M.C.-63) - see para. 4.

The Committee noted the new layout of the Annual Report, and, subject to the above amendments which were communicated to the Secretary, approved the Annual Report of the Director of the Meteorological Office for the year April 1, 1955 to March 31, 1956.

4. Annual Report of the Meteorological Committee to the Secretary of State for Air for the period 1st July, 1955 to 30th June, 1956 (M.C.-63 (draft))

(a) Mr. Dickie drew attention to the recent change in the representation of the Ministry of Transport and Civil Aviation on the Meteorological Committee. It is proposed to amend para. 2 by the addition of the following entry.

> "Mr. E.J. Dickie, M.B.E., has taken the place of Mr. G.M. Macintosh, O.B.E., as one of the representatives of the Ministry of Transport and Civil Aviation."

(b) Mr. Bigg suggested that a mention should be made in the Annual Report of the Meteorological Committee of the arrangements made with the Colonial Office for a special study of the requirements of research in tropical meteorology (see para. 3(c) above). It is proposed to insert a new paragraph as given in para. 3(c) before "International Meteorology".

The draft Annual Report was approved by the Committee, subject to the above amendments.

5. Annual Reports for Kew and Eskdalemuir Observatories for submission to the Gassiot Committee of the Royal Society (M.C.-61)

The Committee noted and approved the Annual Reports on the work carried out at Kew and Eskdalemuir Observatories during the year 1st April, 1955 to 31st March, 1956 (Appendices I and II to M.C.-61) which had been submitted to the Committee before being transmitted to the Royal Society for circulation to members of the Gassiot Committee.

Meteorological Office,
Air Ministry, London, W.C.2.
August, 1956

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METEOROLOGICAL COMMITTEE

AIR MINISTRY

Annual Reports for Kew and Eskdalemuir Observatories for submission to the Gassiot Committee of the Royal Society

1. The Meteorological Committee is required to report annually to the Gassiot Committee on the use made of the income from the Gassiot Trust for magnetic and meteorological observations or other physical investigations in accordance with the terms of the Trust. For this purpose annual reports on the work carried out at Kew and Eskdalemuir Observatories are sent to the Royal Society for circulation to the Gassiot Committee. A sum of £593 13s. 2d. being the income of the Gassiot Fund for 1955, has been received by the Air Ministry from the Royal Society.

2. Accordingly, reports for the year ended 31st March, 1956, for Kew Observatory and Eskdalemuir Observatory are submitted at Appendices I and II for approval by the Meteorological Committee.

O. G. SUTTON
Director

Meteorological Office,
Air Ministry, London, W.C.2.
May, 1956.

Gev.58232/JB/4/56/50

AIR MINISTRY, METEOROLOGICAL OFFICE

KEW OBSERVATORY

Annual Report for the year 1st April, 1955 to 31st March, 1956

1. Meteorological Observations and Records

The autographic records and routine observations which are listed in the attached Appendix were continued.

2. Measurement of Solar Radiation

Continuous records of solar intensity at normal incidence, total and diffuse radiation on a horizontal surface, and illumination of a horizontal surface were maintained. Changes were made in the design and method of calibration of the recording photometer, to eliminate certain systematic errors in the illumination record.

Much time was given to the testing and construction of radiometers and recording instruments for use at International Geophysical Year stations.

Solarimeters measuring the downward and upward flux of radiation were maintained on a Hastings aircraft of the Meteorological Research Flight and the records were measured and tabulated. Information was thus obtained on the albedo of clouds and of industrial haze.

3. Atmospheric Electricity

The records of electrical potential gradient and the measurements of air earth current were continued.

4. Seismology

Satisfactory records were obtained from the three component Galitzin and the short period vertical component seismographs. Copies of seismograms were supplied on request to several foreign observatories. The monthly Seismological Bulletin was distributed as usual.

The staff of the International Seismological Summary is still accommodated in the Observatory.

5. Other Investigations

Investigations of the variation of wind and temperature near the ground continued, a new site being occupied at Graveley, near Huntingdon. Some attention was given to methods of frequency analysis of the observations.

Work on fog problems was intensified. A heat insulated chamber 3 x 3 x 2½m. was brought into use, and it was found that realistic artificial fogs could be produced in it by spraying. Tests of different techniques for determining drop size distribution and liquid water content began.

Investigation of the heat balance of the lowest layers of air during conditions suitable for radiation fog was continued at Cardington.

Meteorological Office,
Air Ministry, London, W.C.2.
April, 1956.

KEW OBSERVATORY, RICHMOND

Appendix to Annual Report of the Superintendent for the year 1st April, 1955 to 31st March, 1956

Routine Observations

(Stand-by instruments, special instruments for research purposes and dervied data not included)

METEOROLOGICAL OBSERVATIONS

(a) Eye Observations	Time of Observation(GMT)	Observations published in (See Note 1 for abbreviations)
(i) Pressure		
Newman Barometer	0600, 1200, 1800	D.W.R.
	0900, 1500, 2100	M.W.R.
(ii) Temperature North Wall Screen		
Dry and Wet Bulb	0600, 1200, 1800	D.W.R. †
	0900, 1500, 2100	M.W.R.
Max. and Min. Dry Bulb	0600, 0900, 1800 2100	D.W.R., M.W.R.
Large Stevenson Screen		
Dry and Wet Bulb Max. and Min. Dry Bulb	0900, 1500	not published
Grass Minimum	0900	D.W.R., O.Y.B.
Earth Temperature (4in., 8in., 1ft., 4ft.,)	0900	M.W.R., O.Y.B.
Solar Max. (Black Bulb in vacuo.)	0900	not published
(iii) Rainfall		
Raingauge, 8 in.	0900 (period 2100-0900)	D.W.R.
	2100 (period 0900-2100)	
	0900 (period 0900-0900)	B.R.
	0600 (period 1800-0600)	not published
	1800 (period 0600-1800)	
(iv) Visibility	0600, 1200, 1800	D.W.R., O.Y.B.
	0900, 1500, 2100	D.W.R., M.W.R., O.Y.B.
(v) Cloud	0600, 1200, 1800	D.W.R., O.Y.B.
	0900, 1500, 2100	D.W.R., M.W.R., O.Y.B.
(vi) Weather		
Past and Present	0600, 1200, 1800	D.W.R., O.Y.B.
	0900, 1500, 2100	O.Y.B.
	0001 - 2400	M.W.R.
(vii) State of Ground	0600, 0900, 1200, 1500 1800, 2100	D.W.R.
(viii) Evaporation	0900	B.R.

† 2400 Dry Bulb Temperature, read from stand-by thermograph, also published in D.W.R.

/(b)

(b) from Self-Recording Instruments	Period of chart	Observations published in (See Note 1 for abbreviations)
(i) Pressure		
Photo-barograph	48 hours	M.W.R., O.Y.B.
(ii) Temperature North Wall Screen		
Photo-thermograph (Dry and Wet Bulb)	48 hours	M.W.R., O.Y.B.
(iii) Wind		
Pressure Tube Anemograph	24 hours	D.W.R., M.W.R., O.Y.B.
(iv) Rainfall		
Tilting Syphon Rainfall Recorder	24 hours	D.W.R., M.W.R., B.R., O.Y.B.
Jardi Rate of Rainfall Recorder (modified)	24 hours	O.Y.B.
(v) Sunshine		
Campbell-Stokes Recorder (early model)	Sunrise to Sunset	D.W.R., M.W.R., O.Y.B.
(vi) Solar Radiation		
Moll Thermopiles with Cambridge Thread Recorders. Direct (i.e. surface normal to beam),	24 hours	M.W.R. till Dec. 1955, O.Y.B
Total on horizontal surface.	24 hours	M.W.R. from Jan. 1956.
Diffuse on horizontal surface.	24 hours	M.W.R. from Jan. 1956.
(vii) Illumination (of horizontal surface)		
Daylight Recorder (Kew Pattern)	24 hours	M.W.R.
(viii) Evaporation		
Standard Tank with Kew Pattern Recorder	24 hours	B.R.
(ix) Atmospheric Pollution		
Owens Filter	24 hours	O.Y.B.
D.S.I.R. Smoke Filter	24 hours	Atmospheric Pollution Bulletin (D.S.I.R.)

/(x)

(b) from Self-Recording Instruments. (Contd.)	Period of chart	Observations published in (See Note 1 for abbreviations)
(x) Night Sky		
Night Sky Camera	weekly	not published

ATMOSPHERIC ELECTRICITY

(a) Eye Observations	Time of Observation(GMT)	
(i) Atmospheric Potential Gradient		
Wilson Electrometer (at ground level)	1500 (on undisturbed days)	O.Y.B.
(ii) Air-Earth Current		
Wilson Electrometer (at ground level)	1500 (on undisturbed days)	O.Y.B.

(b) from Self-Recording instruments	Period of chart	
Atmospheric Potential Gradient		
Photographic Kelvin Electrograph	48 hours	O.Y.B.

SEISMOLOGY

from Self-Recording instruments		
(i) N.E. and Vertical Earth Movements		
Galitzin Seismographs	24 hours	Kew Seismological Bulletin
(ii) Vertical Earth Movements		
Short-period Seismograph	48 hours	

Notes

1. Abbreviations: D.W.R. = Daily Weather Report
M.W.R. = Monthly Weather Report
O.Y.B. = Observatories' Year Book
B.R. = British Rainfall
D.S.I.R. = Department of Scientific and Industrial Research

2. Stand-by recording instruments include Float, open scale, and Micro Barographs; Mercury in steel and Bi-metallic Thermographs; Hair Hygrographs; Rainfall Chronograph and Storm Gauges.

3. Daily and weekly means of certain meteorological observations are also published in the Weekly Return of the Registrar General and mean daily values in a duplicated weekly return produced at Kew Observatory.

4. Publication of the Observatories Year Book has been delayed since the 1937 volume but manuscript copy is available up-to-date. Publication has, however, been resumed; the 1938 volume is now published and the volume for 1939 is in the course of production.

Air Ministry, Meteorological Office

ESKDALEMUIR OBSERVATORY

Annual Report for the year 1st April, 1955, to 31st March, 1956

1. Meteorological Observations and Records. The normal instrumental and other observations were made for synoptic and climatological purposes. Autographic registration of atmospheric pressure, dry-bulb and wet-bulb temperature, wind, rainfall and sunshine was maintained. A night-sky (pole star) recorder was operated until December, 1955, when publication of the records ceased. Hourly values of the meteorological elements were tabulated.

Records of atmospheric pollution, by smoke filter, were obtained for the Director of Fuel Research, Department of Scientific and Industrial Research. The air meter was replaced during the year, as there were indications of a systematic drift.

Arrangements were made to reduce the shelter belt of trees which had begun to affect the exposure of the anemometer and sunshine recorder.

Details of the routine observations made at the Observatory are given in the attached Appendix.

2. Solar Radiation. Total and diffuse radiation received on a horizontal surface were recorded throughout the year. The instruments were recalibrated in July, 1955. Comparisons with a bi-metallic recorder are being made.

3. Atmospheric Electricity. Continuous photographic records of electrical potential gradient were maintained and standardized by absolute measurements made at one metre above the ground at regular intervals of time. The apparatus was moved slightly to avoid loss of insulation from radio active contamination.

4. Terrestrial Magnetism. Absolute observations of the magnetic elements were made thrice weekly or more frequently, using a Kew pattern unifilar megnetometer for declination, a Schuster-Smith coil magnetometer for horizontal force and a Schulze Dip inductor to derive values of the vertical force. Direct measurements of vertical force were made with a BMZ balance magnetometer, and additional measurements of horizontal force with a quartz fibre QHM magnetometer.

Assistance was given to a field party of the Geological Museum and Survey during their survey in the summer of 1955.

Declination, horizontal force and vertical force were recorded continuously by two sets of the La Cour magnetographs, ordinary run and quick run, supplemented by a lower sensitivity set of Adie magnetographs to ensure full recording of storms.

A direct reading horizontal force variometer was successfully operated to give an immediate indication of the state of magnetic disturbance before absolute measurements were undertaken.

Tabulations of the magnetic elements were prepared for the Observatories' Year Book, those of declination also being sent to the 'Colliery Guardian' and the 'Iron and Coal Trades Review'. Daily magnetic character figures (C), three-hourly disturbance indices (K) and data on sudden commencements, were forwarded to the appropriate international bodies. Notification of magnetic disturbance exceeding certain limits was sent to the Radio Research Station at Slough, the Cavendish Laboratory at Cambridge, the Royal Greenwich Observatory at Herstmonceux and the Marconi Company at Chelmsford. Copies of magnetograms were sent to numerous applicants.

Meteorological Office,
Air Ministry, London, W.C.2.
April, 1956.

Gev.58232/JB/4/56/50(b)

ESKDALEMUIR OBSERVATORY, DUMFRIESSHIRE.

Appendix to Annual Report of the Superintendent for the year 1st April, 1955 to 31st March, 1956

Routine Observations

(Stand-by instruments, and special instruments for research purposes, and derived data, not included)

METEOROLOGICAL OBSERVATIONS

(a) Eye Observations	Time of Observation(GMT)	Observations published in (See Note 1 for abbreviations)
(i) Pressure		
Fortin Barometer	0600, 1200, 1800	D.W.R.
	0900, 1500, 2100	M.W.R.
	0800, 1000, 1400	not published
(ii) Temperature Stevenson Screen		
Dry and Wet Bulb	0600, 1200, 1800	D.W.R.
	0900, 1500, 2100	M.W.R.
	0800, 1000, 1400	not published
Max. and Min. dry Bulb	0600, 1800	not published
	0900, 2100	D.W.R., M.W.R.
Max. dry bulb only	1800 (clock time)	not published (press report)
Louvred Hut		
Dry and Wet Bulb	0600, 1200, 1800	not published (control readings for Photo-Thermograph)
Max. and Min. dry Bulb	0600, 1800	
Grass Minimum	0900	D.W.R., O.Y.B.
Earth Temperature (1 ft. and 4ft.)	0900	M.W.R., O.Y.B.
(iii) Rainfall		
Raingauge, 8ins.	0900 (period 2100-0900)	D.W.R.
	2100 (period 0900-2100)	
	0900 (period 0900-0900)	B.R.
	0600 (period 1800-0600)	not published
	1800 (period 0600-1800)	
	1800 (clock time)(period 0900-1800)	not published (press report)
(iv) Visibility	0600, 1200, 1800	D.W.R., O.Y.B.
	0900, 1500, 2100	M.W.R., O.Y.B.
	0800, 1000, 1400	not published
(v) Cloud	0600, 1200, 1800	D.W.R., O.Y.B.
	0900, 1500, 2100	M.W.R., O.Y.B.
	0800, 1000, 1400	not published
(vi) Weather Past and Present	0001 - 2400	M.W.R.
	0600, 1200, 1800	D.W.R., O.Y.B.
	0900, 1500, 2100	O.Y.B.
	0800, 1000, 1400	not published
(vii) State of ground	0600, 1800	not published
	0900, 2100	D.W.R.

/(b)

(b) from Self-Recording Instruments	Period of chart	Observations published (See Note 1 for abbreviation
(i) Pressure		
Photo-barograph	48 hours	M.W.R., O.Y.B.
(ii) Temperature		
Louvred Hut		
Dry and Wet Bulb Photo-thermograph	48 hours	M.W.R., O.Y.B.
(iii) Wind		
Pressure Tube Anemometer	24 hours	D.W.R., M.W.R., O.Y.B.
(iv) Rainfall		
Tilting Syphon Rainfall Recorder	24 hours	M.W.R., B.R., O.Y.B.
Hellmann Fuess Snow Gauge	24 hours	not published
Jardi Rate of Rainfall Recorder (modified)	24 hours	O.Y.B.
(v) Sunshine		
Campbell-Stokes Recorder	Sunrise to Sunset	D.W.R., M.W.R., O.Y.B.
(vi) Solar Radiation		
Moll Thermopiles with Cambridge Thread Recorder. Total on horizontal surface, and diffuse on horizontal surface.	24 hours	O.Y.B., M.W.R.
Bi-metallic Radiation Recorder	24 hours	not published
(vii) Atmospheric Pollution		
D.S.I.R. Smoke Filter	24 hours	Atmospheric Pollution Bulletin (D.S.I.R.)

II ATMOSPHERIC ELECTRICITY

(a) Eye Observations	Time of Observation(GMT)	
Atmospheric Potential Gradient		
Wulf Electrometer (at one metre above ground)	once a week	O.Y.B.

(b) From Self-Recording Instruments	period of chart	
Atmospheric Potential Gradient		
Dolazalek Photographic Electrograph	24 hours	O.Y.B.

/III

II TERRESTRIAL MAGNETISM

(a) Eye Observations	Time of observation(GMT)	Observations published in (See Note 1 for abbreviations)
(i) Magnetic Declination		
Kew Magnetometer	Thrice weekly	not published
(ii) Horizontal Force		
Schuster Smith Coil)	Thrice weekly	not published
Q.H.M. Magnetometer)	Thrice weekly	not published
(iii) Vertical Force		
Schulze Dip Inductor	Thrice weekly	not published
B.M.Z. Magnetometer	Thrice weekly	not published

(b) From Self-Recording Instruments	Period of chart	
Horizontal and Vertical Forces, and Declination		
La Cour Slow Run Photographic Magnetograph	24 hours	O.Y.B. (see notes)
La Cour Quick Run Photographic Magnetograph	24 hours	not published
Supplementary Adie Magnetographs (insensitive)	24 hours	not published
Direct recording H-variometer	24 hours	not published

Notes

1. Abbreviations:
D.W.R. = Daily Weather Report
M.W.R. = Monthly Weather Report
O.Y.B. = Observatories' Year Book
B.R. = British Rainfall
D.S.I.R. = Department of Scientific and Industrial Research.

2. Terrestrial Magnetism: Three-hour-range disturbance indices (K) and magnetic character figures are sent (monthly) to the Royal Netherlands Meteorological Institute, De Bilt for subsequent publication in the yearly bulletins of the Association of Terrestrial Magnetism and Electricity, International Union of Geodesy and Geophyscis. (K) indices are published in the "Journal of Atmospheric and Terrestrial Physics". (K) indices are also sent (monthly), for information, to the Department of Terrestrial Mangetism, Carnegie Institute of Washington, D.C., U.S.A.

3. Magnetic Declination Hourly Values from the La Cour Slow Run Record are published in The Colliery Guardian, and The Iron and Coal Trades Review.

4. Publication of the Observatories' Year Book has been delayed since the 1937 volume but manuscript copy is available up-to-date. Publication has, however, been resumed; the 1938 volume is now published and the volume for 1939 is in the course of production.

METEOROLOGICAL COMMITTEE

AIR MINISTRY

INTERNATIONAL MEETINGS (July, 1955 to June, 1956)

Members of the staff of the Meteorological Office attended the following meetings during the period July, 1955 to June, 1956.

1. WORLD METEOROLOGICAL ORGANISATION

(a) Working Group on Meteorological Transmission of Regional Association VI (Europe), held in Paris, 25th January, to 1st February, 1956, attended by:-

Mr. C.V. Ockenden
Mr. N. Grandy

(b) Second Session of Regional Association VI (Europe), held in Dubrovnik, 12th to 24th March, 1956, attended by:-

Mr. S.P. Peters
Mr. C.V. Ockenden
Mr. M.K. Miles

(c) Executive Committee, held in Geneva, 17th April to 1st May, 1956, attended by:-

The Director
Mr. I.J.W. Pothecary

(d) Trials of radio-sonde equipment arranged by the World Meteorological Organisation, held in Payerne, starting 23rd May, 1956 for three to four weeks, attended by:-

Dr. D.N. Harrison
Mr. A.H. Hooper
Mr. P.G. Felton
Mr. W. Preston

2. INTERNATIONAL CIVIL AVIATION ORGANISATION

(a) Special North Atlantic Regional Air Navigation Meeting, held in Paris, 20th February to 1st March, 1956, attended by:-

Mr. J. Cumming

(b) Third Caribbean Regional Air Navigation Meeting, held in Dominica, 3rd to 21st April, 1956, attended by:-

Mr. E.A. Cope

3. INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS

Third Meeting of the Special Committee for the International Geophysical Year (C.S.A.G.I.), held in Brussels, 8th to 14th September, 1955, attended by:-

Dr. J.M. Stagg

/4.

4. OTHER MEETINGS

(a) Meeting on Physics in Agriculture held under the auspices of the Landbouwhogeschool, Wageninghen, Holland, 7th to 13th September, 1955, attended by:-

Mr. L.P. Smith
Mr. N.E. Rider

(b) Symposium on Numerical Weather Prediction, organised by the Deutsche Wetterdienst Zentralstelle, held in Frankfurt a. M., 23rd to 28th May, 1956, attended by:-

Mr. E. Knighting

Meteorological Office,
Air Ministry, London, W.C.2.
May, 1956.

METEOROLOGICAL COMMITTEE

AIR MINISTRY

Annual Report of the Meteorological Committee to the Secretary of State for Air for the period 1st July, 1955 to 30th June, 1956

1. The meeting of the Meteorological Committee due to be held towards the end of May was postponed by the Chairman until later in the year when the report of the Special Committee appointed to review the work and organisation of the Meteorological Office could be expected to be available. (See para. 4 below). The business of the Committee was conducted by correspondence.

2. Membership. The following changes have taken place in the membership of the Committee during the year.

Professor N. Feather, F.R.S., has succeeded the late Professor W.M.H. Greaves as the representative of the Royal Society of Edinburgh.

Mr. E. J. Dickie, M.B.E., has taken the place of Mr. G. M. Macintosh, O.B.E., as one of the representatives of the Ministry of Transport and Civil Aviation.

3. Annual Report of the Director of the Meteorological Office. The Committee received the Annual Report of the Director of the Meteorological Office for the year 1st April, 1955 to 31st March, 1956, and presented it (after amendment) to the Secretary of State for Air.

4. Review of the Work and Organisation of the Meteorological Office. The Special Committee set up to review the work and organisation of the Meteorological Office (see para. 5 of last year's Annual Report) has considered voluminous evidence, both written and oral, from users of meteorological information, governmental and otherwise. Visits have been made to the Central Forecasting Office, Dunstable and to certain outstations. It is expected that the report will be ready later this year.

5. Move of the Headquarters of the Meteorological Office to Bracknell. Authority has now been given for the present dispersed headquarters of the Meteorological Office to be replaced by a united headquarters in the new town of Bracknell. As the necessary accommodation for the new headquarters has to be built, the move to Bracknell cannot start for another three years. The plan is then to phase it over the following two or three years, in three main instalments spaced at intervals of about a year.

6. Provision of a Telephone Weather Service. The Committee is pleased to note that the WEA automatic telephone service for the London area (see para. 7 of last year's Annual Report) came into full operation at midnight on 4th/5th March, 1956. The total number of calls for the first week was 215,700. The prolonged drought up to the end of May probably led to a smaller use of the service than might otherwise have been made, but in periods of unsettled weather an appreciable increase in the number of calls can be expected. The Postmaster General has decided that definite plans should be made for the extension of the telephone weather service to other parts of the country and discussions are taking place between the Post Office and the Meteorological Office to give effect to this decision.

7. The Broadcasting of Meteorological Information. The Committee is gratified to note that as a result of discussions between the Meteorological Office and the British Broadcasting Corporation further improvements have been made in the presentation of sound weather bulletins and forecasts. The shipping forecasts have been transferred to the Light Programme and their general form and times of transmission changed to meet more precisely the needs of the fishing and marine users generally. The coastal sea areas used in these forecasts have also been changed by the addition of two new areas and the re-naming of two other areas.

The removal of the shipping forecasts from the Home Service has allowed the adoption of a less formal and stereotyped style in the presentation of the forecasts for the general public. The changes appear to have proved acceptable to the majority of listeners.

8. Staffing of the Meteorological Office. The staff situation continues to cause anxiety, especially in the Scientific Officer and Assistant grades. To deal with the ever increasing demands of both investigations and operations the Office needs to recruit many more mathematical physicists in the Scientific Officer class. The slow rate of recruitment is to be attributed to two main causes, the general shortage of applied mathematicians and physicists and the lack of attention paid to meteorology in British Universities. In the Assistant class there is a grave shortage of experienced observers who are essential for the maintenance of a high standard of work at airfields. Both problems are receiving urgent attention.

9. Vacation Students. Applications for attachment to the Meteorological Office during the 1955 summer vacation were received from 49 students at 21 universities. From these 49 students, 12 were selected for attachment to the Meteorological Office, but for various reasons only 7 students finally accepted the offers of attachment. The Committee is glad to learn that the Treasury has agreed that the quota of vacation students for 1956 may be increased from 12 to 15 students.

10. Acquisition of an Electronic Computor. The Committee welcomes the acquisition of a digital electronic computing machine for use in the Meteorological Office. The computer is expected to be installed at the beginning of 1957 in the Napier Shaw Laboratory at the Central Forecasting Office at Dunstable. This will allow of a much expanded programme of research into numerical methods of weather forecasting based on hydrodynamical principles. The computer will also be available for other complicated problems of meteorology where heavy numerical work is involved.

11. Meteorological Research. The Committee took note of the Report of the Meteorological Research Committee for the year ended 31st March, 1956. The Committee is pleased to note that by some re-deployment it has been possible to increase the number of Scientific Officers engaged on research in the Meteorological Office. The Committee notes the continued progress which has been made in the investigation of methods of numerical forecasting based on dynamical principles and that the acquisition of an electronic computer (see para. 10 above) will expedite this work. It also notes that field trials have been started to test the effectiveness of one of the methods which have been suggested for increasing rainfall by artificial means, and recognises the importance of continued research into this problem. The Committee strongly supports the recommendation of the Meteorological Research Committee that an aircraft capable of reaching 60,000 feet be provided for the Meteorological Research Flight in order that known Royal Air Force requirements for meteorological information at the greater heights may be met. The Committee further notes the work done on fundamental research under the auspices of the Gassiot Committee, particularly the preparations being made for the direct exploration by rockets of the physical properties and motion of the high atmosphere.

12. Awards to Civil Airline Personnel. In recognition of the value of weather reports from civil aircraft on standard routes to the Meteorological Office, approval has been given for the presentation of awards, up to a total of £100 per annum, to personnel of airline companies registered in the United Kingdom. The awards will be made annually and will be of two kinds. A number of awards of books, suitably inscribed, will be made to captains or navigators who have provided the best series of reports (in-flight, post-flight or on debriefing) during the twelve months ending in April. In addition up to two awards will be made to captains of aircraft for long and meritorious service in the provision of weather reports. The awards of both kinds will be made by the Director who will be guided by weather reports received at offices maintained by the Meteorological Office.

/13.

13. In connection with the arrangements made in connection with the Centenary of the Meteorological Office (see para. 6 of last year's Annual Report), the sixth and last visit of a forecasting unit to provincial towns was made to Belfast in October, 1955. The Lord Mayor of Belfast, the High Sheriff and Lord Chief Justice of Northern Ireland attended the opening ceremony.

14. The Advisory Committee on Meteorology for Scotland met on 12th July, 1955. The following changes have taken place in the membership during the year.

> Mr. A. C. Cowan replaced Mr. J. S. Munro as the representative of the Scottish Home Department (Fisheries Division).
>
> Professor W. M. H. Greaves died on 24th December, 1955. The Royal Society have not yet nominated their new representative.

15. Report of the Director of the Naval Weather Service. The Committee received and took note of the Abridged Annual Report of the Director of the Naval Weather Service, Admiralty, for the year 1st April, 1955 to 31st March, 1956.

16. Commonwealth Relations. Through personal visits and correspondence advice on research problems continued to be sought by Commonwealth countries on a considerable scale. Arising from representations made by meteorological services in the Colonies, arrangements were made with the Colonial Office for a senior member of the research staff to make a special study of the requirements for research in tropical meteorology and to visit a number of colonial territories to discuss the problems with the Directors.

17. International Meteorology. The Committee noted the activities of the Meteorological Office in the field of international meteorology during the year.

(Sgd.) CHRISTOPHER SOAMES

Chairman

10th October, 1956

M.C. - 64

METEOROLOGICAL COMMITTEE

Report of the Meteorological Research Committee

to the

Secretary of State of Air

for the year ended 31st March, 1956.

The Report of the Meteorological Research Committee (M.R.P. 968A) which was previously circulated was noted by the Committee - see "Record of action following the postponement of the meeting of the Meteorological Committee due to be held towards the end of May or the beginning of June, 1956.

I

M.C. 65

ANNUAL REPORT
OF THE
DIRECTOR NAVAL WEATHER SERVICE

1st April, 1955 to 31st March, 1956

For Members of the Meteorological Committee

Section **A.** GENERAL

B. TRAINING

C. WEATHER MESSAGE ORGANISATION

D. PUBLICATIONS AND CLIMATOLOGY

E. INSTRUMENTS AND EQUIPMENT

F. INVESTIGATIONS

SECTION A - GENERAL

1. Liaison with other Services

Close liaison with all departments of the Air Ministry Meteorological Office was maintained, and on overseas stations, liaison was maintained with other meteorological services by the appropriate Fleet Meteorological Officers.

2. World Meteorological Organisation

The Director of the Naval Weather Service attended the Second Congress of the World Meteorological Organisation in Geneva on 14th April - 13th May, 1955 as a member of the United Kingdom delegation.

3. Conference of Commonwealth Meteorologists

The Director of the Naval Weather Service attended or was represented by an officer of his staff at all sessions of the Commonwealth Meteorological Conference in London, 23rd - 26th May, 1955.

4. Forecast Section, Admiralty

(a) Routine Weather Messages

Routine Fleet Weather Messages prepared by Forecast Section, Admiralty are transmitted daily for the benefit of ships in Home Waters. These messages comprise

(i) Fleet Synoptic Messages (suitable for use in ships with part-time meteorological organisations) covering the three main hour times of observations 0001Z, 0600Z and 1200Z.

(ii) Fleet Analysis Messages, based on the 0001Z and 1200Z charts and

(iii) Fleet Forecast Messages valid for 12 hours from 0500Z and 1700Z with outlooks for a further 12 hours.

The area covered by these Fleet Weather Messages and their contents are varied as necessary to ensure that units at sea obtain the best available information for their particular areas. In addition to these Fleet Weather Messages, Forecast Section issues, in conjunction with the Central Forecasting Office, Air Ministry, Gale Warnings and Strong Upper Wind Warnings for the Home Station.

(b) Special Weather Messages and Forecasts

(i) Messages containing special synoptic reports were sent to H.M. Ships TRUELOVE, VIDAL and MARINER, when carrying a qualified meteorological officer and operating in the North Cape - Barents Sea Areas.

Special synoptic messages were also sent to H.M.S. TRIUMPH when in the Baltic, during the Leningrad visit, and to H.M.S. VIDAL when annexing Rockall.

(ii) In addition to routine weather forecasts, many special forecasts were issued, for example, to Fishery Protection Vessels in Icelandic and Northern waters and tugs undertaking coastal tows, and tows between United Kingdom and Gibraltar, for special operations such as 'Great Dane', 'Cheroot' and 'Fishplay'. The laying of beacons around Black Deep, for submarines on special exercises, H.M.S. TURPIN for her passage between United Kingdom and Bermuda and H.M.S. ACHERON in the Denmark Strait.

In all 1885 special forecasts were issued during the year.

Special forecasts were issued to the following foreign warships on request, the Portuguese ships TEJO and VILA DO PORTO, the Norwegian ship DRAUG, and the Swedish Training Ship FLYING CLIPPER.

/5. (i) Home

5. (i) Home Air Command

There has been no change in the functions of the meteorological centres at Lee-on-Solent, Culdrose and Abbotsinch, each continuing to act as a group advisory and analysis centre for Home Air Command stations. Basic meteorological information is received at these centres from the Air Ministry Meteorological Office Communications Centre at Dunstable by three teleprinter channels. These three teleprinter broadcasts are Channel I, giving data for the United Kingdom plus limited information from Europe and the North Atlantic, Channel II giving detailed continental information from Europe, and the North Atlantic broadcast giving detailed information from North America and the Atlantic. In addition a network of naval teleprinter circuits enables hourly reports of present weather and terminal forecasts to be collected from the satellite Naval Air Stations, exchanged between centres and rebroadcast to all the satellites. Each satellite also receives limited basic information directly from Dunstable on Channel I.

Arrangements have been made for the North Atlantic teleprinter broadcast now received by Lee-on-Solent to be replaced by the Mediterranean teleprinter broadcast from Dunstable. This will provide Lee-on-Solent with more detailed information for the Mediterranean area, which is necessary when providing route forecasts to the Mediterranean area.

(ii) Mediterranean

The Fleet Weather Centre at Malta continues to issue gale warnings, forecasts and analysis messages on the ship broadcast for small ships, also selected basic data for larger ships with meteorological organisations. On behalf of the Air Ministry Meteorological Office, the Fleet Centre also issues gale warnings and forecasts which are broadcast to merchant shipping.

(iii) Far East

The Fleet forecast messages issued from Singapore are prepared entirely by the Malayan Meteorological Service. The Fleet Meteorological Officer maintains a watching brief on the arrangements which have proved satisfactory.

In Hong Kong forecasts and gale warnings for shipping are issued together with basic information supplied by the Royal Observatory, although in this case the Naval Weather Service assists by providing one meteorological officer and two meteorological ratings.

(iv) East Indies, South Atlantic and America and West Indies Stations

There are no Fleet Weather Centres in peace time on these stations for the preparation of Fleet weather messages. On the East Indies and South Atlantic stations selected information from the appropriate national meteorological services is rebroadcast on naval waves. On the America and West Indies station, H.M. ships read United States and Canadian meteorological broadcasts direct.

SECTION B - TRAINING

6. R.N. School of Meteorology

Qualifying courses for both officers and ratings are held at the R.N. School of Meteorology, H.M.S. HARRIER, Kete, Pembrokeshire. Those for officers are of 22 weeks duration, which includes 2 weeks practical training at Naval Air Stations, whilst courses for ratings last 8 weeks.

In addition shorter acquaintance courses are held for officers not specialising in meteorology.

7. **R.N.V.R.**

R.N.V.R. Meteorological Officers, in general, undertake 2 weeks annual training and during this period they may be employed in a seagoing ship with a meteorological organisation, or at a Naval Air Station. Some R.N.V.R. Meteorological Officers and ratings also carry out weekend duties with R.N.V.R. air squadrons.

SECTION C - WEATHER MESSAGES

8. General

There has been no change in the peace time organisation for the supply of weather information to ships, which is as follows:-

(i) Small ships, with no meteorological organisation, are provided for by gale warnings, area forecasts and analyses placed on the appropriate ship broadcast by the Fleet Weather Centre.

(ii) Ships with part-time meteorological organisations read surface synoptic data and upper air information, selected by the Fleet Weather Centres and transmitted on the Admin/Met. broadcasts.

(iii) In addition to reading the above information, ships, such as carriers with full-time meteorological organisations read appropriate national or regional weather broadcasts, in order to obtain the full up-to-date information necessary for flying operations. Schedules, giving times and frequencies of broadcasts together with type of information, have been received in this department from various meteorological organisations throughout the world. These were edited and issued in naval meteorological publications for the use of officers in ships and stations at home and abroad.

SECTION D - PUBLICATIONS & CLIMATOLOGY

9. Publications

(a) N.W.S. Memoranda

The following have been prepared and have been taken in hand for printing:-

N.W.S. Memo 155/55	Computation of Upper Winds and Ballistic Winds.
N.W.S. Memo 156/56	Single Observer Forecasting at Sea in Middle and High Latitudes.

(b) Admiralty Pilots

The meteorological, currents and ice sections of the following Admiralty Pilots have been revised, where appropriate, in conjunction with the Meteorological Office of the Air Ministry:-

South America, Volume II
St. Lawrence
Pacific, Volume II
Eastern Archipelago, Volume III
Biscay
Red Sea
Australia, Volume II

Following the loss of the trawlers LORELLA and RODERIGO through ice accumulation, the sections of Arctic, Antarctic and other high latitude Pilots were examined to see if the possibility of ice accumulation was adequately covered. It was found that the information contained in the Pilots did not fully explain the meteorological conditions in which icing might possibly become dangerous. A statement has therefore been provided by the Meteorological Office of the Air Ministry to be inserted in all appropriate Pilots, with local modifications where necessary.

(c) W. Publications

The following publications have been produced and taken in hand for printing:-

W.14(ST) W.14(AA)	Diagram to facilitate the computation of Upper and Ballistic Winds.
W.16a	Diagram for computing plan range and height - short range
W.16b	Diagram for computing plan range and height - long range

(d) Weather Handbooks

The following is the position regarding handbooks produced by the Meteorological Office of the Air Ministry in collaboration with Naval Weather Service.

"Weather in the Black Sea"	is nearing completion
"Weather in the Mediterranean"	has been delayed by Meteorological Office staff difficulties but work on it is now proceeding and publication is expected within twelve months.
"Weather in Home Waters" (Greenland & Barents Sea Section)	is held up by staff difficulties in the Meteorological Office until work on the previous two handbooks is completed.

(e) Other Meteorological Office Publications

The following have been distributed:-

M.O. 510a	Handbook of Weather Messages Pt.I (2nd Edition)
M.O. 524a	"A study of Warm Fronts"
M.O. 584d	"The Free Atmosphere in the Vicinity of Fronts"
M.O. 534k	"Winds between 300 & 100 mb in the Tropics & Sub-Tropics"
M.O. 584e	"Some Features of the Jet Stream as shown by Aircraft Observations".

(f) Working Charts

A new working chart is being prepared to cover part of the S.E. Pacific not previously provided for.

10. Climatology

Twenty-six written climatological reports have been prepared for Admiralty divisions and departments and other authorities. Many minor requests for climatological information have been answered. Liaison has been maintained with the Royal Naval Personnel Research Committee.

/SECTION E

SECTION E - INSTRUMENTS & EQUIPMENT

11. Ships

Routine inspections were made of R.N. and Dominion aircraft carriers and cruisers building and refitting and meteorological offices were planned and laid out in H.M. Ships NARVIK and PROTECTOR.

12. Shore Establishments

Advice has been given on the layout and maintenance of instruments and equipment at dockyards and Naval Air Stations in the United Kingdom and overseas. The Naval Weather Service has undertaken the servicing of anemographs as a temporary measure until arrangements can be made for them to be serviced by the makers' representatives.

Approval has been obtained for wind speed and direction equipment at Naval Air Stations in the United Kingdom to be fitted with sets of remote reading indicators, so that wind speed and direction can be seen at once in various parts of the control tower.

13. Facsimile

Eight Mufax recorders are now in use in operational ships of the Royal Navy and a further set is being fitted at R.N.A.S. Halfar. Approval is also being sought for a facsimile recorder and associated equipment to be fitted for instructional purposes at the R.N. School of Meteorology, Kete.

Progress is being made in eliminating interference and tuning difficulties in ships fitted with facsimile equipment. A prototype crystal controlled tuning unit has been developed and is being tested in H.M.S. ALBION.

14. Instruments

A close liaison was maintained with both the Meteorological Office, Air Ministry and civilian firms on all matters of current use and future development of instruments.

The siting of anemometers in aircraft carriers still presents considerable difficulty. A specification has been proposed for a reference anemometer which can be temporarily erected on the flight deck of a carrier in a position known from wind tunnel experiments to be free from interference. In this way it will be possible to check the accuracy of the results obtained from the instrument on the mast.

The Meteorological Office has been asked to investigate the possibility of developing a balloon for use at sea whose bursting height will be of the order of 60,000 ft.

15. Trials

(a) Trials were carried out in H.M.S. EAGLE to investigate the practicability of filling and launching balloons in the after lift wells of carriers under operational conditions. The report on these trials is very encouraging.

(b) Successful trials of a new Meteorological Office sea bucket and thermometer for measuring sea temperature were carried out in the Second Training Squadron.

(c) A series of trials was carried out with a new pilot balloon battery for use for windfinding at night. The results were inconclusive and a further series of trials is now in progress.

/16. Radar

16. Radar Windfinding Station, Christmas Island

A radar windfinding station has been set up on Christmas Island, Indian Ocean, in connection with the atomic trials to be carried out in the Monte Bello area this year.

The station, which became operational in April, is manned by one officer and seven ratings, and is almost completely self-contained. The windfinding equipment consists of a GL3 Mark II Mobile Radar set and 500 gramme balloons with Umbrawin reflectors, all of which have been provided by the Meteorological Office. Hydrogen is supplied from two generators lent by the Australian Commonwealth Meteorological Bureau; in addition a considerable stock of gas in cylinders has been provided.

The training of operating and maintenance personnel and the provision of the windfinding equipment was undertaken by the Meteorological Office at very short notice, and their assistance is greatly appreciated.

SECTION F - INVESTIGATIONS

17. The Director, Naval Weather Service was represented on the Meteorological Research Committee and its three sub-committees, and on the Tropospheric Wave Propagation Committee.

18. The accumulation of the following information continues:-

(a) Hourly data for Naval Air Stations on Hollerith Cards

(b) Radio propagation reports from H.M. and Merchant Ships.

19. An analysis of visibility conditions at R.N.A.S. Bramcote has been carried out from the Hollerith card data.

20. Technical advice on a number of subjects has been given to Divisions of the Naval Staff and Admiralty Departments.

M.C. - 66

METEOROLOGICAL COMMITTEE

Annual Report
of the Director of the
Meteorological Office
presented by the Meteorological Committee
to the Secretary of State for Air
for the year
April 1st 1955, to March 31st 1956.

The Annual Report which was previously circulated in proof stage was approved, subject to amendments, by the Committee - see para. 3 of the "Record of action following the postponement of the meeting of the Meteorological Committee due to be held towards the end of May or the beginning of June, 1956."

MINUTES

METEOROLOGICAL COMMITTEE

One Hundred and Seventieth Meeting, held in Historic Room 13, 4th Floor, Air Ministry, Whitehall Gardens, S.W.1. at 3 p.m. on 18th October, 1956

PRESENT:-

Mr. Christopher Soames, M.P. (Chairman)
Under Secretary of State for Air

Mr. W. J. Bigg (Colonial Office)
Sir David Brunt (Royal Society)
Mr. E. J. Dickie (Ministry of Transport and Civil Aviation)
Mr. R.W.N.B. Gilling (Ministry of Transport and Civil Aviation)
Brigadier F. N. W. Gore (War Office)
Mr. N. J. P. Hutchison (Scottish Office)
Sir Edward Salisbury (Ministry of Agriculture, Fisheries and Food)
Professor P.A. Sheppard (British Universities)
Mr. H. T. Smith (Air Ministry)
Instructor Captain E. T. W. Smyth (Naval Weather Service, Admiralty)
Sir Graham Sutton (Director, Meteorological Office)
Air Marshal G. W. Tuttle (Air Ministry)
Sir Owen Wansbrough-Jones (Ministry of Supply)
Mr. R. J. Williams (Secretary)

Apologies for absence were received from

Professor N. Feather (Royal Society of Edinburgh) who was unable to attend because of illness
Mr. W. Lewis (Scottish Office) who was represented by Mr. N. J. P. Hutchison.

1490. The Minutes of the 169th Meeting, held on 15th June, 1954 were confirmed.

1491. The Chairman reported the following changes in the membership of the Committee since the last meeting:

Professor N. Feather, F.R.S. has succeeded the late Professor W.M.H. Greaves as the representative of the Royal Society of Edinburgh.

Mr. R. W. N. B. Gilling has replaced Captain J. H. Quick as a representative of the Ministry of Transport and Civil Aviation

Mr. E. J. Dickie, M.B.E., has replaced Mr. G. M. Macintosh as a representative of the Ministry of Transport and Civil Aviation

Mr. H. T. Smith has succeeded Mr. I. V. H. Campbell, C.B., as a representative of the Air Ministry

Air Marshal G. W. Tuttle, C.B., O.B.E., D.F.C., has succeeded Air Marshal Sir Thomas G. Pike, K.C.B., C.B.E., D.F.C., as the representative of the Air Staff.

1492. Report of a Committee to Review the Organisation of the Meteorological Office

The Chairman invited the Committee to consider the Report of the special committee which had been appointed by the Secretary of State for Air, under the chairmanship of Lord Brabazon, to review the organisation of the Meteorological Office. The Report of Lord Brabazon's Committee had been previously circulated to members under cover of a note by the Secretary. It had been agreed between the Secretary of State for Air and Lord Brabazon

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that his Committee should produce a report suitable for departmental and inter-departmental consideration and not for publication though it was probable that at a later date the Secretary of State would make a statement, possibly in reply to a Parliamentary Question summarising the main conclusions and the decisions reached on them.

The Chairman suggested that the Committee would wish to discuss primarily the sections of the Report which dealt with forecasting and research and the proposal for the re-constitution of the Meteorological Committee. He did not, of course, wish to limit discussion of the other recommendations in the Report, and with the approval of the Secretary of State action had been put in hand on those sections of the Report which are mainly the concern of the Meteorological Office and the Air Ministry. In particular, the proposals for the re-organisation of the upper structure of the Office was now under discussion with the Treasury.

1493. Forecasting - Recommendations (ii) - (iv)

Sir David Brunt referred to paragraphs 25-30 of the Report and stated that he agreed with the conclusions reached and the recommendations made by Lord Brabazon's Committee about forecasting. He stressed the possibilities offered by the development of numerical methods of forecasting with the aid of modern electronic computers, the possibility of achieving greater precision in local forecasting, primarily for the non-aviation user, partly by more detailed study of local weather characteristics and partly by the use of the radar scanner for the tracking of movement of rain. He also mentioned the research problems connected with long range forecasting. The Director referred to the electronic computer which is being purchased for the Meteorological Office. The computer, which should be installed at the beginning of 1957, would be the best of its kind available at the present time. Sir Edward Salisbury stressed the importance of local forecasts for agricultural purposes and he felt that insufficient attention had been given in the Report to the need for local forecasts for farmers. The Director pointed out that more local forecasting was now being done to meet the needs of all non-aviation users, including the special requirements of the farming community. He stressed the additional costs which would be required for any large scale extension of a regional organisation, and drew attention to Recommendation (x) which covered this point. The Chairman asked whether the extension of the WEA telephone service would assist to meet the need for more local forecasts. The Director explained that this service was still partly in the development stage and that experiments were still being made with the type of message best suited to give the public what they wanted. The extension of an automatic telephone service similar to that now provided for London to other areas would require additional staff which could not be made available in present circumstances. Sir David Brunt mentioned that this question was tied up with the revival of the Airmet broadcasts on which the Air Ministry is now initiating a detailed study of the possibilities in conjunction with other interested departments. He emphasised the value of Airmet broadcasts to the general public and specialised non-aviation users. This view was supported by Sir Edward Salisbury and Professor Sheppard, but it was pointed out that Airmet broadcasts would not be able to provide the detailed advice required by some users.

Professor Sheppard referred to Recommendation (iv) and emphasised the importance of maintaining research into long range forecasting and he felt that the recommendation might have been worded differently. In this connection the Director explained certain investigations to the Committee.

The Committee noted Recommendations (ii) - (iv) made by Lord Brabazon's Committee about forecasting in the Meteorological Office.

/1494.

1494. Research - Recommendation (v) - (vi)

Sir David Brunt drew attention to the recommendations about research and mentioned the division of responsibility between the Meteorological Office and the Universities, the co-ordination of the research programme by the Meteorological Research Committee, and the scale of effort devoted to research (paras. 31-38 in the Report). He referred to the proposal for the discontinuance at the end of the present five year period (i.e. in 1961) of the grant (now £7,000 a year) paid to the Gassiot Committee of the Royal Society for certain fundamental research and mentioned the research work which had been carried out under the guidance of the Gassiot Committee. He accepted that there would be an advantage in channelling all grants through the Meteorological Research Committee. The Director said he welcomed the proposal which would give the Meteorological Research Committee additional funds for allocation to important and urgent research problems. Sir Owen Wansbrough-Jones supported the view that all extra mural research should be channelled through the Meteorological Research Committee, but emphasized that the ultimate responsibility should lie with the Director.

The Director referred to the recommendation for the introduction of a system of allowances and grants for post-graduate research in meteorology, on the lines of the system operated by the Department of Scientific and Industrial Research. The Meteorological Research Committee would vet all proposals for grants and would co-ordinate the research work. He agreed that the acceptance of a grant should be free of any obligation to enter the Meteorological Office, but in practice it was hoped the greater number of graduates receiving the grants would find their way into the Office. Sir Owen Wansbrough-Jones supported the recommendation and Professor Sheppard thought that post-graduate research would help in interesting graduates in meteorology.

The Committee noted Recommendations (v) - (vi) made by Lord Brabazon's Committee about research in the Meteorological Office.

1495. Services - Recommendations (vii) - (xi)

The Chairman referred briefly to the recommendations made about the services provided by the Meteorological Office (paras. 39-65 of the Report). The Director referred to Recommendation (vii) about personal briefing which was provided for aviation. He stressed the requirement for information of a technical nature because of changes in the types of military and civil aircraft. He also emphasised the difficulty of meeting all requirements for personal briefing owing to limited manpower resources, but civil airlines were opposed to any cuts in the services provided for personal briefing. With regard to Recommendation (viii) the Director mentioned that he was looking into the question of the use of facsimile charts to do away or reduce the requirement for plotting by Assistants. The special reviews of both Service and civil aviation requirements by working parties recommended by Lord Brabazon's Committee had already been started. The Meteorological Office was also looking into the proposals made in Recommendation (ix) about the maintenance of close contact with the authorities concerned with the fishing industry. With reference to Recommendation (x) the Director mentioned that the setting up of Lord Brabazon's Committee was partly the result of a memorandum which he had put forward containing proposals for a regional organisation to meet the needs of agricultural, industrial and general non-aviation users, but the Committee felt that they could not support all the suggestions of the original memorandum.

Instructor Captain Smyth stated that the Naval Weather Service had similar problems, and might like to send an observer to the working parties which were conducting the special reviews of Service and civil aviation requirements. Mr. Smith said he would send relevant papers to the Director of the Naval Weather Service.

The Committee noted Recommendations (vii) - (xi) made by Lord Brabazon's Committee about the services provided by the Meteorological Office.

1496. Staffing - Recommendation (xii) - (xix)

The Chairman mentioned the recommendations made about the staffing of the Meteorological Office. Sir David Brunt drew attention to Recommendation (xii) about the desirability of introducing a "departmental" class or classes in view of the difficulties experienced in recruiting and retaining staff in certain grades. Mr. Smith stated that the Establishment Division were opposed to the introduction of departmental classes. He thought that the Staff Side would also be opposed to the introduction of such classes. There was no guarantee that the conditions of service of a departmental class would be the same as those of general Civil Service classes, and the general tendency was for the conditions to lag behind. The Director said he was strongly opposed in general to departmental classes and he would regard the introduction of a departmental class in the Meteorological Office, even at the lowest level, as a retrograde step. He considered that it would be better to concentrate on improvements in existing conditions, particularly as regards career prospects. Mr. Smith stated that the Establishment Division accepted Recommendation (xii) of Lord Brabazon's Committee. Sir Owen Wansbrough-Jones thought that whilst the introduction of a departmental class might help recruitment at the start, he was of the opinion that the position would worsen later. Mr. Smith agreed with this view. In this connection Mr. Smith referred to para. 101 of the Report (Recommendation (xviii)) about the recruitment of a limited number of entrants with degrees in geography, who have studied physics and mathematics as ancillary subjects, and said that the matter was being studied within the Air Ministry. A scheme to implement the recommendation had already received Treasury sanction and the Director was now in touch with the Imperial College of Science on the question of detailed arrangements for the special courses which would be required (See also below.) He did not anticipate any difficulty in implementing the proposals.

Sir Owen Wansbrough-Jones drew attention to Appendix K to the Report giving a comparative table of the establishment "structures" of scientific staff in the main employing departments. The percentages given in the table, especially those for the higher posts, compared unfavourably with other departments, and he emphasised the poor career prospects for scientific staff in the Meteorological Office. He suggested that the existing establishment was not adequate to provide the career prospects offered by the Civil Service Commission pamphlets. The Director agreed that the Office offered worse career prospects than other departments and this was reflected in the inadequate intake of scientific officers. It showed that the Meteorological Office could not compete with other departments in attracting recruits. Also the conditions of service appertaining to the Meteorological Office, which involve irregular hours of working and liability for posting to remote stations in the United Kingdom and to others overseas, were less attractive to possible recruits. Both these reasons contributed to a deterioration in the quality of new entrants. Mr. Smith explained the considerations involved in formulating an establishment to a given structure. The Director emphasised that it was essential that the career prospects in the Meteorological Office should be brought into line with those prevailing in the Scientific Civil Service.

The Chairman referred to the proposal in para. 101 (Recommendation (xviii)) of the Report (see also above), and Sir David Brunt thought that it might prove a useful supplement to the normal entry of physicists and mathematicians. Professor Sheppard was of the opinion that the proposal would be in the way of an experiment, and said that the Department of Meteorology, Imperial College of Science would be glad to assist with the proposed post-graduate course.

The Committee noted Recommendations (xii) - (xix) made by Lord Brabazon's Committee about the staffing of the Meteorological Office.

1497. Organisation and grading of higher posts - Recommendations (xx)-(xxiii)

The Chairman referred briefly to these recommendations and stated that the proposals were now under discussion with the Treasury.

The Committee noted Recommendations (xx) - (xxiii) made by Lord Brabazon's Committee about the organisation and grading of higher posts in the Meteorological Office.

1498. Control and Direction - Recommendations (xxiv) - (xxviii)

The Chairman invited the Committee to consider Recommendations (xxiv) - (xxviii) of Lord Brabazon's Report and particularly Recommendation (xxvi) which contained proposals for the winding up of the existing Meteorological Committee and its replacement by another and differently constituted Advisory Committee.

Air Marshal Tuttle mentioned in connection with Recommendation (xxv) the relationship between the Meteorological Office and the Royal Air Force and said that the existing arrangements for meeting the requirements of the Royal Air Force were satisfactory.

Sir David Brunt stated that he accepted the conclusions reached by Lord Brabazon's Committee about the place of the Meteorological Office in government organisation. He also agreed that the Meteorological Committee as at present constituted does not perform any useful purpose, but he considered that there was a need for an independent advisory body as a guarantee that the meteorological requirements of other important users are not being subordinated to those of aviation. The Meteorological Office had an established status of its own, both nationally and internationally, and also its services to the non-aviation user were bound to steadily expand, and on both counts the disappearance of a Meteorological Committee, tending as it would to withdraw the Office into the anonymity of a department of the Air Ministry, would be regrettable. He, therefore, welcomed the proposals for a new Advisory Committee which would be non-representative and with terms of reference as proposed in Lord Brabazon's Report. Sir Edward Salisbury agreed that a smaller committee was desirable and emphasised the need for one of the members of the Advisory Committee to have specialised knowledge of the requirements of the farming community. He also thought that the members should be selected for their personal contributions and not because they were representatives of a particular body or interest. Sir Owen Wansbrough-Jones was of the opinion that liaison with agricultural and other interests could be made through official and national bodies. The Director mentioned the work done by the agricultural branch of the Office and that liaison with agricultural and related organisations both official and non-official appeared to be satisfactory. Mr. Hutchison referred to the complex requirements of Scotland for meteorological information and advice. Scottish interests were many and varied and stressed that these requirements should not be overlooked by the new committee. Mr. Bigg stated that the Colonial Office did not object to the proposals for a re-constituted committee and he confirmed that liaison at normal official channels would meet the needs of the Colonial Office for meteorological advice as such liaison had done in the past.

Professor Sheppard was of the opinion that a re-constituted committee was desirable if what was wanted was a committee to provide active supervision of the Meteorological Office. A "watch dog" committee, such as the existing committee had tended to be, was not perhaps without its points, but opinion evidently veered towards a new structure.

The Director suggested that the President of the Royal Society should always be consulted concerning the appointment of the scientific member (apart from the Chairman of the Meteorological Research Committee) to the new advisory body and this was supported by Sir David Brunt.

The Committee noted Recommendations (xxiv) - (xxviii) made by Lord Brabazon's Committee about the control and direction of the Meteorological Office and accepted the proposal that the existing Meteorological Committee should be replaced by a smaller Committee which would be "non-representative" and with the terms of reference proposed in Lord Brabazon's Report.

1499. Finance - Recommendations (xxix) - (xxxi)

The Chairman asked whether the Committee had any observations to make on the recommendations about finance. Professor Sheppard referred to the danger in assessing the work of the Meteorological Office in financial terms. Mr. Smith explained that the form of the estimates of the cost of meteorological services followed normal practice and could not be easily changed.

1500. The Chairman stated that there was wide agreement by the Committee with the conclusions reached and the recommendations made by the Special Committee appointed by the Secretary of State for Air, under the chairmanship of Lord Brabazon, to review the organisation of the Meteorological Office. He thanked present and past members of the Meteorological Committee for the valuable services they had rendered to the Meteorological Office and the Air Ministry.

The Director also expressed his appreciation of the help and advice the Meteorological Committee had given to him and to past Directors which had been of great assistance to the Meteorological Office. The Committee also expressed its appreciation of the work of Mr. R. J. Williams, who has acted as Secretary of the Meteorological Committee since it resumed its meetings in 1946.

1501. The Committee rose at 4.15 p.m.